

FACT SHEET APPENDICES

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APPENDIX A

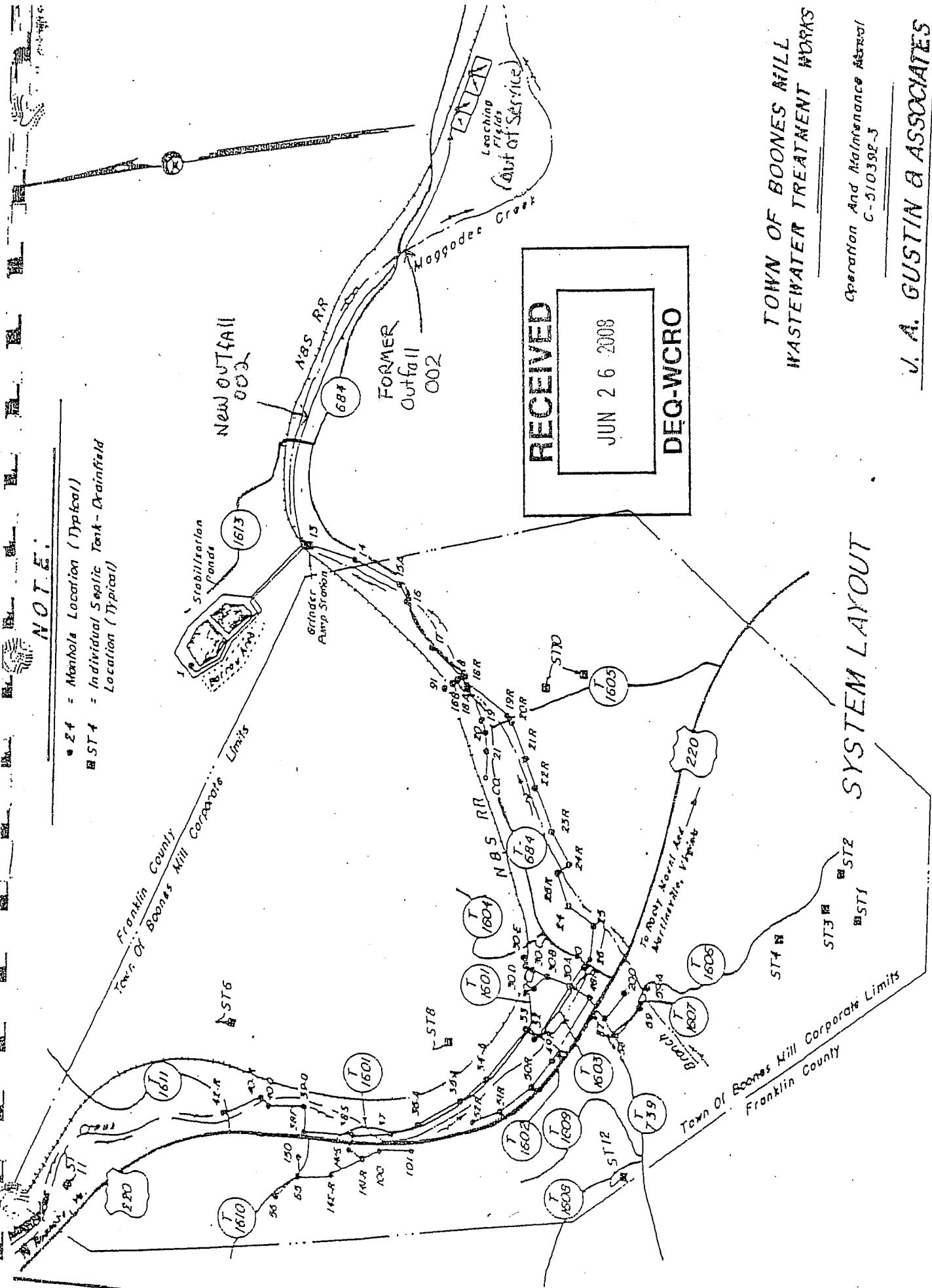
LOCATION MAP FOR WASTEWATER TREATMENT FACILITIES

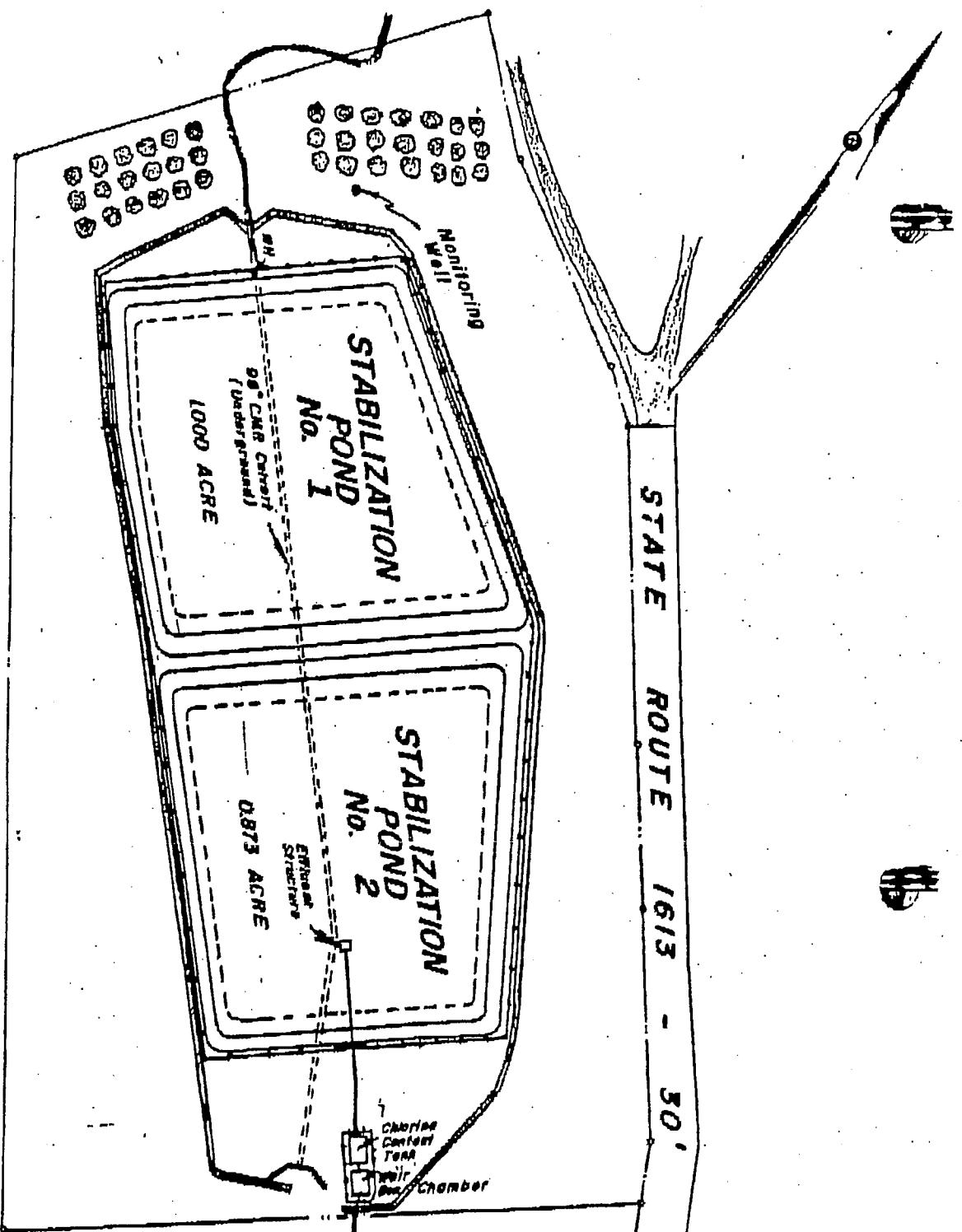
TREATMENT PONDS SITE DIAGRAM

SITE VISIT REPORT

NOTE:

- 24 = Manhole Location (Typical)
- ST 4 = Individual Septic Tank - Drainfield Location (Typical)





NORFOLK AND SOUTHERN RAILWAY - 100' R/W

1.000 ACRE

**TOWN OF BOONES MIL
WASTEWATER TREATMENT**

Plan of Operation And Maintenance Manual

C-510392-3

January 10, 1987
SCALE: 1" = 100'

PLATE II

J. A. GUSTIN & ASSOC.
Consulting Engineers
Martinsville, Virginia

MEMORANDUM

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY
BLUE RIDGE REGIONAL OFFICE
3019 Peters Creek Road
Roanoke, Virginia 24019-2738

Subject: Site Visit for VPDES Permit Reissuance – VA0067245
Town of Boones Mill Sewage Treatment Plant (STP)

To: Permit File

From: Bob Tate, water permit writer *RS*

Date: July 8, 2010

Introduction

The Boones Mill STP was visited for permit reissuance Thursday morning, July 9, 2010. Lynn Frith, town manager, and Bob Tate, DEQ permit writer, were present. Before observing the facilities, Mr. Frith and the writer discussed anticipated aspects of the forthcoming permit. Then the following operational units were observed: influent grinder pump station, stabilization/facultative ponds (lagoons), chlorine contact tank, flow measurement tank, dechlorination tank, and discharge site on Maggodee Creek (Outfall 002). All units are located in Franklin County outside the town limits. The influent pump station is located beside Boones Mill Road (State Route 684) just east of the town limits. The lagoons and associated tanks are located at 159 Primrose Road (State Route 1613). Outfall 002 is located off Boones Mill Road, on the west bank of Maggodee Creek approximately 130 feet southeast of the intersection of State Routes 684 and 1612. Outfall 002 was originally established for emergency use when rapid infiltration basins (RIBs) were the primary discharge mechanism. For over ten years all discharges have been through Outfall 002. Outfall 002 was relocated approximately 1400 feet upstream in March, 2008. The RIBs were deconstructed in (fall of) 2008.

Operation

STP design capacity is 30,000 gallons a day (gpd). Raw wastewater flows from the collection system to the influent pump station. The pump station contains two matching submersible grinder pumps, each controlled by a separate electrical panel. Solids from the pump station are removed periodically by a septic service. Wastewater is pumped to one of the two stabilization/facultative lagoons. Henceforth flow is by gravity. The lagoons are separated by an earthen berm but connected in series. A curtain separates the second lagoon into two sections. Primary and secondary treatment are provided. Sludge has never accumulated in the lagoons. Effluent flows from the lagoons to an open chlorine contact tank. Household bleach (6% sodium hypochlorite solution) is fed undiluted from a 40 gallon tank by a 24 gpd (at 100 psi) solution feed pump to a baffled rectangular contact tank. From the contact tank wastewater flows to another rectangular tank with a V-notch weir and a flow meter. The flow meter measures percentage of full flow. Full flow is 0.017 MGD. From the metering tank flow goes to a square tank that

Town of Boones Mill STP
Site Visit for VPDES Permit Reissuance
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contains a tablet dechlorinator. Tablets are sodium sulfite. Fully treated effluent from the dechlor tank flows to Outfall 002 on Maggodee Creek.

When the lagoons become full, wastewater is released for chlorination, flow measurement, dechlorination, and discharge. Discharge is periodic, continuously discharging for 3-4 weeks at a time. There have been 16 discharge events since January 1, 2006.

Observations

One of the influent grinder pumps was out of service. A replacement pump and control panel have been ordered. Historically pump life appears to be short, perhaps a year.

There was no discernable odor at the lagoons.

The area around the lagoons was well maintained.

The curtain in the downstream lagoon had been removed for maintenance.

The lagoons were devoid of duckweed, unlike the site visit August 19, 2005

Ducks and turtles were observed in the lagoons.

Sodium hypochlorite (6% household bleach) and sodium sulfite tablets were stored at the lagoon property.

The facility was not discharging. The current permit restricts discharge to October though May.

The new outfall location is a big improvement. The previous location was difficult to find and access. The current outfall pipe is better protected. The new location also allows better initial mixing in Maggodee Creek.

APPENDIX B

RECEIVING STREAM INFORMATION

FLOW FREQUENCY MEMORANDUM

AMBIENT STATISTICS

HARDNESS

pH

TEMPERATURE

WATER QUALITY STANDARDS PARAMETERS

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION Blue Ridge Regional Office 3019 Peters Creek Road Roanoke, Virginia 24019

SUBJECT: Flow Frequencies Determination
Town of Boones Mill Sewage Treatment Plant – VA0067245

TO: Permit File

FROM: Bob Tate, BRRO *TST*

DATE: June 24, 2010

This memo is an update of the previous flow frequencies determination memo dated September 6, 2005. Stream flow frequencies are required for use in developing effluent limitations for the VPDES permit. The Boones Mill Sewage Treatment Plant (STP) discharges to Outfall 002 on Maggodee Creek. In March 2008 the outfall was relocated upstream of the previous site. However, the drainage area remains the same.

From 1981 to 1984 the USGS conducted seven flow measurements on Maggodee Creek (#02056950), approximately 2½ miles upstream of the discharge point. The measurements made by the USGS correlated very well with the same day daily mean values from the continuous record gage on the Blackwater River near Rocky Mount, VA (#02056900). The measurements and daily mean values were plotted on a logarithmic graph and a best fit line was determined by regression analysis. The flow frequencies from the reference gage were plugged into the formula for the regression line and the associated flow frequencies at the measurement site were calculated. The flow frequencies at the discharge point were determined by using the values at the measurement site and adjusting them by proportional drainage areas. The data for the reference gage, the measurement site, and the discharge point are presented below. The calculation spreadsheet is attached.

Blackwater River near Rocky Mount, VA (#02056900):

Drainage Area = 115 mi²

1Q10	= 8.4 cfs	High Flow 1Q10	= 32 cfs
7Q10	= 9.8 cfs	High Flow 7Q10	= 38 cfs
30Q10	= 16 cfs	High Flow 30Q10	= 51 cfs
30Q5	= 22 cfs	HM	= 61 cfs

Maggodee Creek upstream of Boones Mill, VA (#02056950):

Drainage Area = 11.02 mi²

1Q10	= 0.29 cfs	High Flow 1Q10	= 1.98 cfs
7Q10	= 0.36 cfs	High Flow 7Q10	= 2.53 cfs
30Q10	= 0.73 cfs	High Flow 30Q10	= 3.87 cfs
30Q5	= 1.15 cfs	HM	= 5.02 cfs

Flow Frequencies Determination
Town of Boones Mill STP – VA0067245
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Maggodee Creek at discharge point (downstream of Boones Mill, VA):

	Drainage Area = 14.19 mi ²
1Q10	= 0.37 cfs = 0.24 MGD
7Q10	= 0.46 cfs = 0.30 MGD
30Q10	= 0.94 cfs = 0.60 MGD
30Q5	= 1.48 cfs = 0.96 MGD
	High Flow 1Q10 = 2.55 cfs = 1.64 MGD
	High Flow 7Q10 = 3.26 cfs = 2.11 MGD
	High Flow 30Q10 = 4.99 cfs = 3.22 MGD
	HM = 6.46 cfs = 4.17 MGD

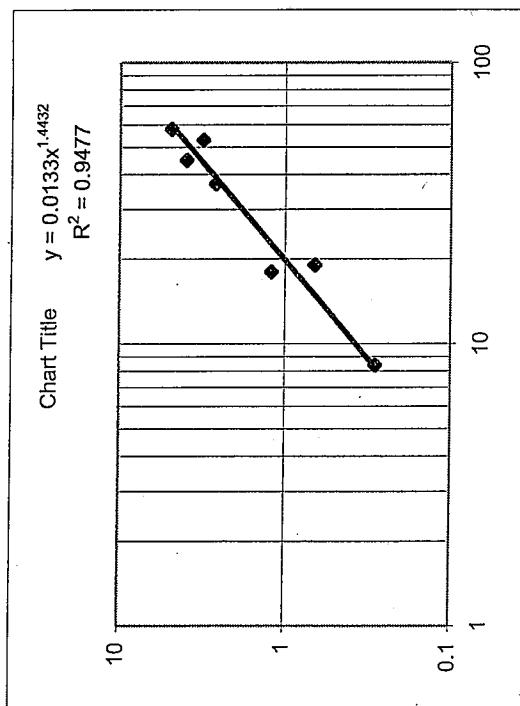
The high flow months are January through May.

This analysis assumes there are no significant discharges, withdrawals, or springs influencing the flow in Maggodee Creek between the partial record gage and the discharge point.

Notes: Continuous gage stream measurements are through 2003.
Flow statistics were compiled in 2005.

Attachment: spreadsheet with flow calculations

date	BlackWater flow @ 020568500	Maggodee flow @ 020568500	critical flows	2056900	20568500	discharge point
8/25/1981	8.4	0.28	harmonic mean	61	5.02	6.46
9/22/1981	18	1.2	HF30Q10	51	3.87	4.17
10/22/1981	19	0.66	HF7Q10	38	2.53	3.22
7/22/1982	58	4.9	HF1Q10	32	1.98	2.11
10/21/1982	45	3.96	30Q5	22	1.15	1.64
8/4/1983	37	2.63	30Q10	16	0.73	0.96
8/22/1984	53	3.14	7Q10	9.8	0.36	0.60
			1Q10	8.4	0.29	0.30
			1Q300	4.6	0.12	0.10
						MGD
				cfs	cfs	cfs
				cfs	cfs	cfs



TOTAL HARDNESS

Collection Date & Time	Parameter Code	Parameter Name	CaCO ₃ mg/L
6/25/01 15:25	900	TOT HARD CACO ₃ MG/L	12.4
5/23/01 14:20	900	TOT HARD CACO ₃ MG/L	28.6
4/26/01 13:30	900	TOT HARD CACO ₃ MG/L	5
3/26/01 15:40	900	TOT HARD CACO ₃ MG/L	14.5
2/27/01 13:45	900	TOT HARD CACO ₃ MG/L	28.3
1/22/01 16:00	900	TOT HARD CACO ₃ MG/L	24
1/22/01 16:00	900	TOT HARD CACO ₃ MG/L	24.9
11/27/00 15:20	900	TOT HARD CACO ₃ MG/L	29.7
10/24/00 14:00	900	TOT HARD CACO ₃ MG/L	36.1
9/25/00 15:30	900	TOT HARD CACO ₃ MG/L	32.5
8/28/00 15:45	900	TOT HARD CACO ₃ MG/L	31
7/25/00 13:30	900	TOT HARD CACO ₃ MG/L	37
6/29/00 11:50	900	TOT HARD CACO ₃ MG/L	28.9
5/25/00 15:20	900	TOT HARD CACO ₃ MG/L	31
4/25/00 11:15	900	TOT HARD CACO ₃ MG/L	23
3/23/00 13:10	900	TOT HARD CACO ₃ MG/L	19
2/22/00 13:10	900	TOT HARD CACO ₃ MG/L	38
1/24/00 12:45	900	TOT HARD CACO ₃ MG/L	29.1
11/22/99 12:40	900	TOT HARD CACO ₃ MG/L	24.9
9/21/99 13:30	900	TOT HARD CACO ₃ MG/L	38.4
7/22/99 13:20	900	TOT HARD CACO ₃ MG/L	32.8
		MEAN HARDNESS	27

Stream Name: Maggodee Creek
Station ID: 4AMEE009.86
Station Description: Route 635 Bridge
Latitude: 37° 6' 14"
Longitude: 79° 52' 26"
Watershed Code: VAW-L09R

TOTAL HARDNESS

Collection Date & Time	Parameter Code	Parameter Name	CaCO ₃ mg/L
4/19/99 13:20	900	TOT HARD CACO ₃ MG/L	26
1/21/99 13:45	900	TOT HARD CACO ₃ MG/L	42
10/29/98 14:00	900	TOT HARD CACO ₃ MG/L	29
7/27/98 14:00	900	TOT HARD CACO ₃ MG/L	29.1
4/13/98 8:55	900	TOT HARD CACO ₃ MG/L	47.4
1/20/98 13:30	900	TOT HARD CACO ₃ MG/L	24.4
10/28/97 8:40	900	TOT HARD CACO ₃ MG/L	29.8
7/31/97 13:45	900	TOT HARD CACO ₃ MG/L	32.5
4/28/97 13:45	900	TOT HARD CACO ₃ MG/L	23.5
1/27/97 13:20	900	TOT HARD CACO ₃ MG/L	22.5
10/21/96 13:25	900	TOT HARD CACO ₃ MG/L	29
7/24/96 14:25	900	TOT HARD CACO ₃ MG/L	32
4/17/96 13:30	900	TOT HARD CACO ₃ MG/L	20
1/24/96 8:20	900	TOT HARD CACO ₃ MG/L	23
10/30/95 12:30	900	TOT HARD CACO ₃ MG/L	30
7/31/95 13:00	900	TOT HARD CACO ₃ MG/L	32
4/18/95 8:35	900	TOT HARD CACO ₃ MG/L	25
1/25/95 15:10	900	TOT HARD CACO ₃ MG/L	21
10/19/94 9:15	900	TOT HARD CACO ₃ MG/L	30
7/28/94 11:22	900	TOT HARD CACO ₃ MG/L	45
4/28/94 13:55	900	TOT HARD CACO ₃ MG/L	24
1/24/94 14:20	900	TOT HARD CACO ₃ MG/L	26
10/27/93 14:10	900	TOT HARD CACO ₃ MG/L	28
7/28/93 14:30	900	TOT HARD CACO ₃ MG/L	42
4/27/93 13:15	900	TOT HARD CACO ₃ MG/L	22
1/26/93 13:20	900	TOT HARD CACO ₃ MG/L	24
10/26/92 14:20	900	TOT HARD CACO ₃ MG/L	38
7/16/92 14:15	900	TOT HARD CACO ₃ MG/L	36
4/20/92 14:30	900	TOT HARD CACO ₃ MG/L	30
10/21/91 13:30	900	TOT HARD CACO ₃ MG/L	34
3/19/90 10:00	900	TOT HARD CACO ₃ MG/L	26
12/18/89 11:00	900	TOT HARD CACO ₃ MG/L	22
9/19/89 10:00	900	TOT HARD CACO ₃ MG/L	26
6/26/89 10:00	900	TOT HARD CACO ₃ MG/L	28
5/22/89 14:05	900	TOT HARD CACO ₃ MG/L	27
3/13/89 11:00	900	TOT HARD CACO ₃ MG/L	26
MEAN HARDNESS			29

Stream Name: Maggodee Creek
Station ID: 4AMEE002.38
Station Description: Route 698 Ford
Latitude: 37° 4' 12"
Longitude: 79° 50' 11"
Watershed Code: VAW-L09R

Field pH Data

Collection Date & Time	pH in SU
8/26/99 7:53	7.91
8/12/99 9:30	8
9/13/95 10:50	7.94
8/29/95 11:25	7.59
8/21/95 14:30	7.58
8/8/95 13:30	7.4
8/2/95 10:25	7.47
8/2/95 10:14	7.52
7/25/95 13:45	7.56
7/19/95 10:10	7.4
7/11/95 13:40	7.34
7/6/95 10:55	7.48
6/27/95 12:55	7.15
6/27/95 12:50	7.16
6/19/95 13:05	7.46
6/13/95 9:50	7.54
6/8/95 13:30	7.2
6/7/95 13:10	7.22
5/31/95 9:45	7.56
5/24/95 13:25	7.45
5/24/95 13:15	7.17
5/15/95 14:20	7.24
5/11/95 10:30	7.92
5/9/95 11:30	7.36
5/3/95 14:15	7.79
4/27/95 10:15	7.83
4/27/95 10:00	8.06
4/26/95 13:30	7.65
4/17/95 14:20	7.91
4/12/95 11:00	8.02
9/7/94 10:15	7.84
8/18/94 9:44	7.56
7/25/94 10:07	8.85
7/18/94 9:03	7.97
7/14/94 8:20	8.43
7/13/94 8:53	7.8
7/13/94 8:43	8.05
6/22/94 9:45	8.32
6/13/94 9:40	8.43
6/13/94 9:30	8.47
6/6/94 9:53	8.08
6/1/94 9:18	7.81
5/25/94 8:15	7.9
5/16/94 11:01	7.26
5/12/94 9:28	7.51
5/10/94 12:49	7.5
5/10/94 12:39	7.61
4/28/94 12:00	7.1
4/27/94 9:50	7.7
4/18/94 9:48	7.85
4/13/94 9:01	7.36
4/13/94 8:51	7.54
9/20/93 9:18	8
9/15/93 13:20	8.06
9/15/93 13:17	8.09
9/1/93 12:15	8.11

9/1/93 12:07	8.21
8/24/93 9:37	7.54
8/19/93 12:50	7.98
8/19/93 12:48	7.93
8/16/93 9:53	8.02
8/3/93 13:08	8.14
7/27/93 10:08	7.84
7/27/93 10:03	8.2
7/22/93 9:50	7.88
7/22/93 9:41	8.24
7/20/93 11:59	8.39
7/13/93 9:42	8.18
7/8/93 12:24	8.07
7/1/93 11:06	8.08
6/23/93 8:54	7.77
6/14/93 12:06	7.82
6/10/93 8:59	7.74
6/9/93 11:30	7.68
6/9/93 11:26	7.69
6/2/93 9:58	7.83
5/26/93 13:12	7.64
5/20/93 12:20	7.54
5/13/93 11:05	7.61
5/10/93 13:57	7.98
5/6/93 12:00	7.65
4/29/93 9:55	8.13
4/28/93 10:02	7.1
9/29/92 12:17	7.84
9/21/92 13:30	8.09
9/21/92 13:03	7.91
9/16/92 14:26	8.18
8/31/92 9:35	8.56
8/27/92 13:05	8.7
8/25/92 12:48	8.61
8/18/92 10:13	7.59
8/11/92 13:05	7.68
8/5/92 9:37	8.35
7/29/92 11:55	7.95
7/22/92 12:11	7.57
7/13/92 11:30	7.6
7/8/92 9:44	7.7
7/8/92 9:35	8.12
6/25/92 10:30	7.48
6/24/92 10:05	7.63
6/15/92 9:00	7.92
6/9/92 9:10	7.98
6/3/92 9:50	7.77
6/3/92 9:40	8.33
6/2/92 9:50	7.77
6/2/92 9:40	8.33
5/27/92 9:55	8.51
5/21/92 9:40	8.03
5/11/92 9:30	8.27
5/6/92 10:08	8.01
4/30/92 9:15	8.12
8/12/91 13:15	7.6
8/6/91 9:20	7.64
7/29/91 9:40	7.97

7/25/91 12:45	7.84
7/17/91 9:10	7.79
7/17/91 8:55	7.74
7/8/91 14:25	7.93
7/2/91 9:25	7.59
6/24/91 12:40	7.81
6/20/91 9:00	7.62
6/5/91 11:30	7.42
5/28/91 10:20	7.57
5/28/91 10:00	7.24
90th percentile pH	8.31
10th percentile pH	7.37

Stream Name: Maggodee Creek
Station ID: 4AMEE021.13
Station Description: Route 613 Bridge
Latitude: 37° 8' 45"
Longitude: 80° 0' 34"
Watershed Code: VAW-L09R

Field Temperature Data

Temperature in ° Celsuis	Collection Date & Time	Temperature in ° Celsuis
19.1	8/26/99 7:53	
20.8	8/12/99 9:30	
20.5	9/13/95 10:50	
21.9	8/29/95 11:25	
25.5	8/21/95 14:30	
17.8	8/8/95 13:30	
21.2	8/2/95 10:25	
21.2	8/2/95 10:14	
24.5	7/25/95 13:45	
18.9	7/19/95 10:10	
22.3	7/11/95 13:40	
18.8	7/6/95 10:55	
16.2	6/27/95 12:55	
16.5	6/27/95 12:50	
17.2	6/19/95 13:05	
15.1	6/13/95 9:50	
23.8	6/8/95 13:30	
19.8	6/7/95 13:10	
15.2	5/31/95 9:45	15.2
22.3	5/24/95 13:25	22.3
22.2	5/24/95 13:15	22.2
21.5	5/15/95 14:20	21.5
14.7	5/11/95 10:30	14.7
12.1	5/9/95 11:30	12.1
12.4	5/3/95 14:15	12.4
12.4	4/27/95 10:15	12.4
12	4/27/95 10:00	12
16.5	4/26/95 13:30	16.5
15.3	4/17/95 14:20	15.3
11.3	4/12/95 11:00	11.3
16.7	9/7/94 10:15	
17.8	8/18/94 9:44	
21.1	7/25/94 10:07	
20.8	7/18/94 9:03	
20.3	7/14/94 8:20	
20.1	7/13/94 8:53	
20.3	7/13/94 8:43	
19.9	6/22/94 9:45	
18.5	6/13/94 9:40	
18.4	6/13/94 9:30	
17.7	6/6/94 9:53	
17.1	6/1/94 9:18	
16	5/25/94 8:15	16
18.1	5/16/94 11:01	18.1
13.9	5/12/94 9:28	13.9
14.3	5/10/94 12:49	14.3
15.6	5/10/94 12:39	15.6
17	4/28/94 12:00	17
15.7	4/27/94 9:50	15.7
11	4/18/94 9:48	11
12	4/13/94 9:01	12
12.3	4/13/94 8:51	12.3
16.9	9/20/93 9:18	
24.9	9/15/93 13:20	
24.9	9/15/93 13:17	
25.8	9/1/93 12:15	

26.1	9/1/93 12:07	
20.9	8/24/93 9:37	
24.8	8/19/93 12:50	
24.7	8/19/93 12:48	
22.8	8/16/93 9:53	
24.6	8/3/93 13:08	
22.4	7/27/93 10:08	
22.9	7/27/93 10:03	
21.6	7/22/93 9:50	
21.6	7/22/93 9:41	
26.2	7/20/93 11:59	
22.3	7/13/93 9:42	
26.6	7/8/93 12:24	
22.6	7/1/93 11:06	
18.3	6/23/93 8:54	
17.4	6/14/93 12:06	
19.2	6/10/93 8:59	
22.3	6/9/93 11:30	
22.4	6/9/93 11:26	
14.4	6/2/93 9:58	
19.5	5/26/93 13:12	19.5
16.2	5/20/93 12:20	16.2
17.1	5/13/93 11:05	17.1
21.6	5/10/93 13:57	21.6
17.7	5/6/93 12:00	17.7
12.4	4/29/93 9:55	12.4
10.5	4/28/93 10:02	10.5
11.9	4/19/93 10:20	11.9
17.4	9/29/92 12:17	
19.9	9/21/92 13:30	
19.6	9/21/92 13:03	
22.8	9/16/92 14:26	
18.8	8/31/92 9:35	
25.4	8/27/92 13:05	
24.9	8/25/92 12:48	
19.8	8/18/92 10:13	
27.4	8/11/92 13:05	
18.9	8/5/92 9:37	
23	7/29/92 11:55	
23.8	7/22/92 12:11	
24.3	7/13/92 11:30	
18	7/8/92 9:44	
17.9	7/8/92 9:35	
16.3	6/25/92 10:30	
17.4	6/24/92 10:05	
15.6	6/15/92 9:00	
15.2	6/9/92 9:10	
14.4	6/3/92 9:50	
14.5	6/3/92 9:40	
14.4	6/2/92 9:50	
14.5	6/2/92 9:40	
15.2	5/27/92 9:55	15.2
14	5/21/92 9:40	14
13.2	5/11/92 9:30	13.2
9.9	5/6/92 10:08	9.9
10.5	4/30/92 9:15	10.5
20	8/12/91 13:15	
20	8/6/91 9:20	

18.5	7/29/91 9:40
26.2	7/25/91 12:45
19.3	7/17/91 9:10
19.1	7/17/91 8:55
27.5	7/8/91 14:25
20.9	7/2/91 9:25
18.2	6/24/91 12:40
18.5	6/20/91 9:00
16.1	6/10/91 9:10
17.8	6/5/91 11:30
17.4	5/28/91 10:20
17.7	5/28/91 10:00
24.8	high-flow months
	January - May
90% annual temp	90% wet season temp

Stream Name: Maggodee Creek

Station ID: 4AMEE021.13

Station Description: Route 613 Bridge

Latitude: 37° 8' 45"

Longitude: 80° 0' 34"

Watershed Code: VAW-L09R

MONTHLY TEMPERATURE AVERAGES

4AMEE021.13 Route 613 Bridge

month	average temp	# data points
Jan	no data	0
Feb	no data	0
Mar	no data	0
Apr	12.9	14
May	16.4	23
Jun	17.5	29
Jul	21.9	29
Aug	21.8	21
Sept	21.4	11
Oct	no data	0
Nov	no data	0
Dec	no data	0

4AMEE009.86 Route 635 Bridge

month	average temp	# data points
Jan	1.3	2
Feb	8.2	2
Mar	10.9	2
Apr	12.9	2
May	19.8	2
Jun	21.6	2
Jul	22.1	2
Aug	21.3	1
Sept	18.9	2
Oct	14.2	1
Nov	10.4	2
Dec	no data	0

4AMEE007.85 Route 687 Bridge

month	average temp	# data points
Jan	2.7	2
Feb	8.1	2
Mar	11.2	2
Apr	12.8	15
May	16.7	28
Jun	20.1	32
Jul	23.6	31
Aug	23.1	22
Sept	20.3	10
Oct	14.9	1
Nov	7.9	1
Dec	1.6	1

4AMEE002.38 Route 698 Ford

month	average temp	# data points
Jan	4.7	7
Feb	no data	0
Mar	10.6	1
Apr	14.3	20
May	17.3	28
Jun	20.2	27
Jul	23.3	38
Aug	22.2	21
Sept	19.8	11
Oct	12.0	8
Nov	no data	0
Dec	0.8	1

WATER QUALITY CRITERIA MONITORING

Collection Date & Time	Parameter Code	Parameter Name	Value
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		AMMONIA	0.02	average
8/26/99 7:53	610	NH3+NH4-N TOTAL MG/L	0	
8/12/99 9:30	610	NH3+NH4-N TOTAL MG/L	0	
9/13/95 10:50	610	NH3+NH4-N TOTAL MG/L	0	
8/29/95 11:25	610	NH3+NH4-N TOTAL MG/L	0	
8/21/95 14:30	610	NH3+NH4-N TOTAL MG/L	0	
8/8/95 13:30	610	NH3+NH4-N TOTAL MG/L	0	
8/2/95 10:25	610	NH3+NH4-N TOTAL MG/L	0	
8/2/95 10:14	610	NH3+NH4-N TOTAL MG/L	0	
7/25/95 13:45	610	NH3+NH4-N TOTAL MG/L	0	
7/19/95 10:10	610	NH3+NH4-N TOTAL MG/L	0	
7/11/95 13:40	610	NH3+NH4-N TOTAL MG/L	0	
7/6/95 10:55	610	NH3+NH4-N TOTAL MG/L	0	
6/27/95 12:55	610	NH3+NH4-N TOTAL MG/L	0	
6/27/95 12:50	610	NH3+NH4-N TOTAL MG/L	0	
6/19/95 13:05	610	NH3+NH4-N TOTAL MG/L	0	
6/13/95 9:50	610	NH3+NH4-N TOTAL MG/L	0	
6/8/95 13:30	610	NH3+NH4-N TOTAL MG/L	0	
6/7/95 13:10	610	NH3+NH4-N TOTAL MG/L	0.04	
5/31/95 9:45	610	NH3+NH4-N TOTAL MG/L	0	
5/24/95 13:25	610	NH3+NH4-N TOTAL MG/L	0	
5/24/95 13:15	610	NH3+NH4-N TOTAL MG/L	0	
5/15/95 14:20	610	NH3+NH4-N TOTAL MG/L	0.11	
5/11/95 10:30	610	NH3+NH4-N TOTAL MG/L	0	
5/9/95 11:30	610	NH3+NH4-N TOTAL MG/L	0	
5/3/95 14:15	610	NH3+NH4-N TOTAL MG/L	0	
4/27/95 10:15	610	NH3+NH4-N TOTAL MG/L	0	
4/27/95 10:00	610	NH3+NH4-N TOTAL MG/L	0	
4/26/95 13:30	610	NH3+NH4-N TOTAL MG/L	0.04	
4/17/95 14:20	610	NH3+NH4-N TOTAL MG/L	0	
4/12/95 11:00	610	NH3+NH4-N TOTAL MG/L	0.05	
9/7/94 10:15	610	NH3+NH4-N TOTAL MG/L	0.04	
9/6/94 10:05	610	NH3+NH4-N TOTAL MG/L	0	
8/18/94 9:44	610	NH3+NH4-N TOTAL MG/L	0	
7/25/94 10:07	610	NH3+NH4-N TOTAL MG/L	0.06	
7/18/94 9:03	610	NH3+NH4-N TOTAL MG/L	0.05	
7/14/94 8:20	610	NH3+NH4-N TOTAL MG/L	0	
7/13/94 8:53	610	NH3+NH4-N TOTAL MG/L	0.05	
7/13/94 8:43	610	NH3+NH4-N TOTAL MG/L	0.04	
6/22/94 9:45	610	NH3+NH4-N TOTAL MG/L	0.05	
6/13/94 9:40	610	NH3+NH4-N TOTAL MG/L	0.05	
6/13/94 9:30	610	NH3+NH4-N TOTAL MG/L	0.06	
6/6/94 9:53	610	NH3+NH4-N TOTAL MG/L	0.07	
6/1/94 9:18	610	NH3+NH4-N TOTAL MG/L	0.05	
5/25/94 8:15	610	NH3+NH4-N TOTAL MG/L	0	
5/16/94 11:01	610	NH3+NH4-N TOTAL MG/L	0.05	
5/12/94 9:28	610	NH3+NH4-N TOTAL MG/L	0.05	
5/10/94 12:49	610	NH3+NH4-N TOTAL MG/L	0	
5/10/94 12:39	610	NH3+NH4-N TOTAL MG/L	0	
4/28/94 12:00	610	NH3+NH4-N TOTAL MG/L	0	
4/27/94 9:50	610	NH3+NH4-N TOTAL MG/L	0	
4/18/94 9:48	610	NH3+NH4-N TOTAL MG/L	0	
4/13/94 9:01	610	NH3+NH4-N TOTAL MG/L	0.07	
4/13/94 8:51	610	NH3+NH4-N TOTAL MG/L	0.07	
9/20/93 9:18	610	NH3+NH4-N TOTAL MG/L	0	

9/15/93 13:20	610	NH3+NH4-N TOTAL MG/L	0
9/15/93 13:17	610	NH3+NH4-N TOTAL MG/L	0
9/1/93 12:15	610	NH3+NH4-N TOTAL MG/L	0
9/1/93 12:07	610	NH3+NH4-N TOTAL MG/L	0
8/24/93 9:37	610	NH3+NH4-N TOTAL MG/L	0
8/19/93 12:50	610	NH3+NH4-N TOTAL MG/L	0
8/19/93 12:48	610	NH3+NH4-N TOTAL MG/L	0.06
8/16/93 9:53	610	NH3+NH4-N TOTAL MG/L	0.05
8/9/93 9:37	610	NH3+NH4-N TOTAL MG/L	0
8/3/93 13:08	610	NH3+NH4-N TOTAL MG/L	0.07
7/27/93 10:08	610	NH3+NH4-N TOTAL MG/L	0.04
7/27/93 10:03	610	NH3+NH4-N TOTAL MG/L	0.05
7/22/93 9:50	610	NH3+NH4-N TOTAL MG/L	0
7/22/93 9:41	610	NH3+NH4-N TOTAL MG/L	0
7/20/93 11:59	610	NH3+NH4-N TOTAL MG/L	0.06
7/13/93 9:42	610	NH3+NH4-N TOTAL MG/L	0.06
7/8/93 12:24	610	NH3+NH4-N TOTAL MG/L	0.08
7/1/93 11:06	610	NH3+NH4-N TOTAL MG/L	0.08
6/23/93 8:54	610	NH3+NH4-N TOTAL MG/L	0.04
6/14/93 12:06	610	NH3+NH4-N TOTAL MG/L	0.04
6/10/93 8:59	610	NH3+NH4-N TOTAL MG/L	0
6/9/93 11:30	610	NH3+NH4-N TOTAL MG/L	0.04
6/9/93 11:26	610	NH3+NH4-N TOTAL MG/L	0.07
6/2/93 9:58	610	NH3+NH4-N TOTAL MG/L	0
5/26/93 13:12	610	NH3+NH4-N TOTAL MG/L	0.05
5/20/93 12:20	610	NH3+NH4-N TOTAL MG/L	0
5/13/93 11:05	610	NH3+NH4-N TOTAL MG/L	0
5/10/93 13:57	610	NH3+NH4-N TOTAL MG/L	0.04
5/6/93 12:00	610	NH3+NH4-N TOTAL MG/L	0.05
4/29/93 9:55	610	NH3+NH4-N TOTAL MG/L	0
4/28/93 10:02	610	NH3+NH4-N TOTAL MG/L	0.04
4/19/93 10:20	610	NH3+NH4-N TOTAL MG/L	0.05
9/29/92 12:17	610	NH3+NH4-N TOTAL MG/L	0
9/21/92 13:30	610	NH3+NH4-N TOTAL MG/L	0
9/21/92 13:03	610	NH3+NH4-N TOTAL MG/L	0
9/16/92 14:26	610	NH3+NH4-N TOTAL MG/L	0
8/31/92 9:35	610	NH3+NH4-N TOTAL MG/L	0
8/27/92 13:05	610	NH3+NH4-N TOTAL MG/L	0
8/25/92 12:48	610	NH3+NH4-N TOTAL MG/L	0
8/18/92 10:13	610	NH3+NH4-N TOTAL MG/L	0
8/11/92 13:05	610	NH3+NH4-N TOTAL MG/L	0.06
8/5/92 9:37	610	NH3+NH4-N TOTAL MG/L	0
7/29/92 11:55	610	NH3+NH4-N TOTAL MG/L	0
7/22/92 12:11	610	NH3+NH4-N TOTAL MG/L	0
7/13/92 11:30	610	NH3+NH4-N TOTAL MG/L	0.04
7/8/92 9:44	610	NH3+NH4-N TOTAL MG/L	0.04
7/8/92 9:35	610	NH3+NH4-N TOTAL MG/L	0.04
6/25/92 10:30	610	NH3+NH4-N TOTAL MG/L	0
6/24/92 10:05	610	NH3+NH4-N TOTAL MG/L	0
6/15/92 9:00	610	NH3+NH4-N TOTAL MG/L	0
6/9/92 9:10	610	NH3+NH4-N TOTAL MG/L	0
6/3/92 9:50	610	NH3+NH4-N TOTAL MG/L	0
6/3/92 9:40	610	NH3+NH4-N TOTAL MG/L	0
6/2/92 9:50	610	NH3+NH4-N TOTAL MG/L	0
6/2/92 9:40	610	NH3+NH4-N TOTAL MG/L	0
5/27/92 9:55	610	NH3+NH4-N TOTAL MG/L	0.04
5/21/92 9:40	610	NH3+NH4-N TOTAL MG/L	0
5/11/92 9:30	610	NH3+NH4-N TOTAL MG/L	0

5/6/92 10:08	610	NH3+NH4-N TOTAL MG/L	0
4/30/92 9:15	610	NH3+NH4-N TOTAL MG/L	0.05
8/12/91 13:15	610	NH3+NH4-N TOTAL MG/L	0
8/6/91 9:20	610	NH3+NH4-N TOTAL MG/L	0
7/29/91 9:40	610	NH3+NH4-N TOTAL MG/L	0
7/25/91 12:45	610	NH3+NH4-N TOTAL MG/L	0
7/17/91 9:10	610	NH3+NH4-N TOTAL MG/L	0
7/17/91 8:55	610	NH3+NH4-N TOTAL MG/L	0
7/8/91 14:25	610	NH3+NH4-N TOTAL MG/L	0
7/2/91 9:25	610	NH3+NH4-N TOTAL MG/L	0
6/24/91 12:40	610	NH3+NH4-N TOTAL MG/L	0
6/20/91 9:00	610	NH3+NH4-N TOTAL MG/L	0
6/10/91 9:10	610	NH3+NH4-N TOTAL MG/L	0
6/5/91 11:30	610	NH3+NH4-N TOTAL MG/L	0.04
5/28/91 10:20	610	NH3+NH4-N TOTAL MG/L	0
5/28/91 10:00	610	NH3+NH4-N TOTAL MG/L	0

		NITRATE	0.33	average
8/26/99 7:53	620	NO3-N TOTAL MG/L	0.33	
8/12/99 9:30	620	NO3-N TOTAL MG/L	0.44	
9/13/95 10:50	620	NO3-N TOTAL MG/L	0.27	
8/29/95 11:25	620	NO3-N TOTAL MG/L	0.26	
8/21/95 14:30	620	NO3-N TOTAL MG/L	0.28	
8/8/95 13:30	620	NO3-N TOTAL MG/L	0.33	
8/2/95 10:25	620	NO3-N TOTAL MG/L	0.31	
8/2/95 10:14	620	NO3-N TOTAL MG/L	0.25	
7/25/95 13:45	620	NO3-N TOTAL MG/L	0.23	
7/19/95 10:10	620	NO3-N TOTAL MG/L	0.27	
7/11/95 13:40	620	NO3-N TOTAL MG/L	0.24	
7/6/95 10:55	620	NO3-N TOTAL MG/L	0.34	
6/27/95 12:55	620	NO3-N TOTAL MG/L	0.44	
6/27/95 12:50	620	NO3-N TOTAL MG/L	0.45	
6/19/95 13:05	620	NO3-N TOTAL MG/L	0.26	
6/13/95 9:50	620	NO3-N TOTAL MG/L	0.28	
6/8/95 13:30	620	NO3-N TOTAL MG/L	0.24	
6/7/95 13:10	620	NO3-N TOTAL MG/L	0.26	
5/31/95 9:45	620	NO3-N TOTAL MG/L	0.24	
5/24/95 13:25	620	NO3-N TOTAL MG/L	0.18	
5/24/95 13:15	620	NO3-N TOTAL MG/L	0.18	
5/15/95 14:20	620	NO3-N TOTAL MG/L	0.18	
5/11/95 10:30	620	NO3-N TOTAL MG/L	0.2	
5/9/95 11:30	620	NO3-N TOTAL MG/L	0.22	
5/3/95 14:15	620	NO3-N TOTAL MG/L	0.26	
4/27/95 10:15	620	NO3-N TOTAL MG/L	0.26	
4/27/95 10:00	620	NO3-N TOTAL MG/L	0.27	
4/26/95 13:30	620	NO3-N TOTAL MG/L	0.21	
4/17/95 14:20	620	NO3-N TOTAL MG/L	0.22	
4/12/95 11:00	620	NO3-N TOTAL MG/L	0.38	
9/7/94 10:15	620	NO3-N TOTAL MG/L	0.24	
9/6/94 10:05	620	NO3-N TOTAL MG/L	0.31	
8/18/94 9:44	620	NO3-N TOTAL MG/L	0.7	
7/25/94 10:07	620	NO3-N TOTAL MG/L	0.15	
7/18/94 9:03	620	NO3-N TOTAL MG/L	0.34	
7/14/94 8:20	620	NO3-N TOTAL MG/L	0.24	
7/13/94 8:53	620	NO3-N TOTAL MG/L	0.25	
7/13/94 8:43	620	NO3-N TOTAL MG/L	0.25	
6/22/94 9:45	620	NO3-N TOTAL MG/L	0.34	
6/13/94 9:40	620	NO3-N TOTAL MG/L	0.3	

6/13/94 9:30	620	NO3-N TOTAL MG/L	0.34
6/6/94 9:53	620	NO3-N TOTAL MG/L	0.32
6/1/94 9:18	620	NO3-N TOTAL MG/L	0.27
5/25/94 8:15	620	NO3-N TOTAL MG/L	0.34
5/16/94 11:01	620	NO3-N TOTAL MG/L	0.34
5/12/94 9:28	620	NO3-N TOTAL MG/L	0.33
5/10/94 12:49	620	NO3-N TOTAL MG/L	0.29
5/10/94 12:39	620	NO3-N TOTAL MG/L	0.28
4/28/94 12:00	620	NO3-N TOTAL MG/L	0.33
4/27/94 9:50	620	NO3-N TOTAL MG/L	0.31
4/18/94 9:48	620	NO3-N TOTAL MG/L	0.38
4/13/94 9:01	620	NO3-N TOTAL MG/L	0.44
4/13/94 8:51	620	NO3-N TOTAL MG/L	0.48
9/20/93 9:18	620	NO3-N TOTAL MG/L	0.4
9/15/93 13:20	620	NO3-N TOTAL MG/L	0.19
9/15/93 13:17	620	NO3-N TOTAL MG/L	0.2
9/1/93 12:15	620	NO3-N TOTAL MG/L	0.19
9/1/93 12:07	620	NO3-N TOTAL MG/L	0.18
8/24/93 9:37	620	NO3-N TOTAL MG/L	0.35
8/19/93 12:50	620	NO3-N TOTAL MG/L	0.26
8/19/93 12:48	620	NO3-N TOTAL MG/L	0.29
8/16/93 9:53	620	NO3-N TOTAL MG/L	0.24
8/9/93 9:37	620	NO3-N TOTAL MG/L	0.22
8/3/93 13:08	620	NO3-N TOTAL MG/L	0.26
7/27/93 10:08	620	NO3-N TOTAL MG/L	0.16
7/27/93 10:03	620	NO3-N TOTAL MG/L	0.15
7/22/93 9:50	620	NO3-N TOTAL MG/L	0.09
7/22/93 9:41	620	NO3-N TOTAL MG/L	0.1
7/20/93 11:59	620	NO3-N TOTAL MG/L	0.24
7/13/93 9:42	620	NO3-N TOTAL MG/L	0.26
7/8/93 12:24	620	NO3-N TOTAL MG/L	0.27
7/1/93 11:06	620	NO3-N TOTAL MG/L	0.29
6/23/93 8:54	620	NO3-N TOTAL MG/L	0.32
6/14/93 12:06	620	NO3-N TOTAL MG/L	0.36
6/10/93 8:59	620	NO3-N TOTAL MG/L	0.39
6/9/93 11:30	620	NO3-N TOTAL MG/L	0.38
6/9/93 11:26	620	NO3-N TOTAL MG/L	0.83
6/2/93 9:58	620	NO3-N TOTAL MG/L	0.32
5/26/93 13:12	620	NO3-N TOTAL MG/L	0.37
5/20/93 12:20	620	NO3-N TOTAL MG/L	0.38
5/13/93 11:05	620	NO3-N TOTAL MG/L	0.35
5/10/93 13:57	620	NO3-N TOTAL MG/L	0.37
5/6/93 12:00	620	NO3-N TOTAL MG/L	0.33
4/29/93 9:55	620	NO3-N TOTAL MG/L	0.33
4/28/93 10:02	620	NO3-N TOTAL MG/L	0.37
4/19/93 10:20	620	NO3-N TOTAL MG/L	0.43
9/29/92 12:17	620	NO3-N TOTAL MG/L	0.68
9/21/92 13:30	620	NO3-N TOTAL MG/L	0.4
9/21/92 13:03	620	NO3-N TOTAL MG/L	0.4
9/16/92 14:26	620	NO3-N TOTAL MG/L	0.26
8/31/92 9:35	620	NO3-N TOTAL MG/L	0.34
8/27/92 13:05	620	NO3-N TOTAL MG/L	0.26
8/25/92 12:48	620	NO3-N TOTAL MG/L	0.24
8/18/92 10:13	620	NO3-N TOTAL MG/L	0.36
8/11/92 13:05	620	NO3-N TOTAL MG/L	0.3
8/5/92 9:37	620	NO3-N TOTAL MG/L	0.4
7/29/92 11:55	620	NO3-N TOTAL MG/L	0.4
7/22/92 12:11	620	NO3-N TOTAL MG/L	0.41

7/13/92 11:30	620	NO3-N TOTAL MG/L	0.48
7/8/92 9:44	620	NO3-N TOTAL MG/L	0.46
7/8/92 9:35	620	NO3-N TOTAL MG/L	0.47
6/25/92 10:30	620	NO3-N TOTAL MG/L	0.5
6/24/92 10:05	620	NO3-N TOTAL MG/L	0.42
6/15/92 9:00	620	NO3-N TOTAL MG/L	0.51
6/9/92 9:10	620	NO3-N TOTAL MG/L	0.62
6/3/92 9:50	620	NO3-N TOTAL MG/L	0.47
6/3/92 9:40	620	NO3-N TOTAL MG/L	0.49
6/2/92 9:50	620	NO3-N TOTAL MG/L	0.47
6/2/92 9:40	620	NO3-N TOTAL MG/L	0.49
5/27/92 9:55	620	NO3-N TOTAL MG/L	0.46
5/21/92 9:40	620	NO3-N TOTAL MG/L	0.55
5/11/92 9:30	620	NO3-N TOTAL MG/L	0.42
5/6/92 10:08	620	NO3-N TOTAL MG/L	0.6
4/30/92 9:15	620	NO3-N TOTAL MG/L	0.8
8/12/91 13:15	620	NO3-N TOTAL MG/L	0.25
8/6/91 9:20	620	NO3-N TOTAL MG/L	0.21
7/29/91 9:40	620	NO3-N TOTAL MG/L	0.38
7/25/91 12:45	620	NO3-N TOTAL MG/L	0.15
7/17/91 9:10	620	NO3-N TOTAL MG/L	0.24
7/17/91 8:55	620	NO3-N TOTAL MG/L	0.23
7/8/91 14:25	620	NO3-N TOTAL MG/L	0.31
7/2/91 9:25	620	NO3-N TOTAL MG/L	0.31
6/24/91 12:40	620	NO3-N TOTAL MG/L	0.27
6/20/91 9:00	620	NO3-N TOTAL MG/L	0.28
6/10/91 9:10	620	NO3-N TOTAL MG/L	0.32
6/5/91 11:30	620	NO3-N TOTAL MG/L	0.26
5/28/91 10:20	620	NO3-N TOTAL MG/L	0.31
5/28/91 10:00	620	NO3-N TOTAL MG/L	0.32

		CHLORIDE	0	average
8/26/99 7:53	940	CHLORIDE TOTAL MG/L	0	
8/12/99 9:30	940	CHLORIDE TOTAL MG/L	0	

		SULFATE	0	average
8/26/99 7:53	945	SULFATE SO4-TOT MG/L	0	
8/12/99 9:30	945	SULFATE SO4-TOT MG/L	0	

		FECAL COLIFORM	
8/26/99 7:53	31616	FEC COLIMFM-FCBR /100ML	800
8/12/99 9:30	31616	FEC COLIMFM-FCBR /100ML	300
9/13/95 10:50	31616	FEC COLIMFM-FCBR /100ML	1200
8/29/95 11:25	31616	FEC COLIMFM-FCBR /100ML	400
8/8/95 13:30	31616	FEC COLIMFM-FCBR /100ML	2700
8/2/95 10:25	31616	FEC COLIMFM-FCBR /100ML	1000
8/2/95 10:14	31616	FEC COLIMFM-FCBR /100ML	1700
7/25/95 13:45	31616	FEC COLIMFM-FCBR /100ML	900
7/19/95 10:10	31616	FEC COLIMFM-FCBR /100ML	1200
7/11/95 13:40	31616	FEC COLIMFM-FCBR /100ML	1700
7/6/95 10:55	31616	FEC COLIMFM-FCBR /100ML	300
6/19/95 13:05	31616	FEC COLIMFM-FCBR /100ML	2300
6/13/95 9:50	31616	FEC COLIMFM-FCBR /100ML	2500
6/8/95 13:30	31616	FEC COLIMFM-FCBR /100ML	1300
6/7/95 13:10	31616	FEC COLIMFM-FCBR /100ML	3400
5/31/95 9:45	31616	FEC COLIMFM-FCBR /100ML	700
5/15/95 14:20	31616	FEC COLIMFM-FCBR /100ML	100
5/11/95 10:30	31616	FEC COLIMFM-FCBR /100ML	1100

5/9/95 11:30	31616	FEC COLIMFM-FCBR /100ML	100
5/3/95 14:15	31616	FEC COLIMFM-FCBR /100ML	1100
4/27/95 10:15	31616	FEC COLIMFM-FCBR /100ML	100
4/27/95 10:00	31616	FEC COLIMFM-FCBR /100ML	2200
4/26/95 13:30	31616	FEC COLIMFM-FCBR /100ML	400
4/17/95 14:20	31616	FEC COLIMFM-FCBR /100ML	600
4/12/95 11:00	31616	FEC COLIMFM-FCBR /100ML	400
9/7/94 10:15	31616	FEC COLIMFM-FCBR /100ML	600
9/6/94 10:05	31616	FEC COLIMFM-FCBR /100ML	500
8/18/94 9:44	31616	FEC COLIMFM-FCBR /100ML	1000
8/11/94 9:49	31616	FEC COLIMFM-FCBR /100ML	700
7/25/94 10:07	31616	FEC COLIMFM-FCBR /100ML	1100
7/18/94 9:03	31616	FEC COLIMFM-FCBR /100ML	1700
7/14/94 8:20	31616	FEC COLIMFM-FCBR /100ML	400
7/13/94 8:53	31616	FEC COLIMFM-FCBR /100ML	1500
7/13/94 8:43	31616	FEC COLIMFM-FCBR /100ML	1000
6/22/94 9:45	31616	FEC COLIMFM-FCBR /100ML	1000
6/13/94 9:40	31616	FEC COLIMFM-FCBR /100ML	2500
6/13/94 9:30	31616	FEC COLIMFM-FCBR /100ML	1500
6/6/94 9:53	31616	FEC COLIMFM-FCBR /100ML	600
6/1/94 9:18	31616	FEC COLIMFM-FCBR /100ML	1200
5/25/94 8:15	31616	FEC COLIMFM-FCBR /100ML	8000
5/16/94 11:01	31616	FEC COLIMFM-FCBR /100ML	500
5/12/94 9:28	31616	FEC COLIMFM-FCBR /100ML	700
5/10/94 12:49	31616	FEC COLIMFM-FCBR /100ML	400
5/10/94 12:39	31616	FEC COLIMFM-FCBR /100ML	400
4/28/94 12:00	31616	FEC COLIMFM-FCBR /100ML	100
4/27/94 9:50	31616	FEC COLIMFM-FCBR /100ML	100
4/18/94 9:48	31616	FEC COLIMFM-FCBR /100ML	500
4/13/94 9:01	31616	FEC COLIMFM-FCBR /100ML	4700
4/13/94 8:51	31616	FEC COLIMFM-FCBR /100ML	4700
9/20/93 9:18	31616	FEC COLIMFM-FCBR /100ML	100
9/15/93 13:20	31616	FEC COLIMFM-FCBR /100ML	200
9/15/93 13:17	31616	FEC COLIMFM-FCBR /100ML	300
9/1/93 12:15	31616	FEC COLIMFM-FCBR /100ML	300
9/1/93 12:07	31616	FEC COLIMFM-FCBR /100ML	500
8/24/93 9:37	31616	FEC COLIMFM-FCBR /100ML	700
8/19/93 12:50	31616	FEC COLIMFM-FCBR /100ML	700
8/19/93 12:48	31616	FEC COLIMFM-FCBR /100ML	400
8/16/93 9:53	31616	FEC COLIMFM-FCBR /100ML	400
8/9/93 9:37	31616	FEC COLIMFM-FCBR /100ML	2200
8/3/93 13:08	31616	FEC COLIMFM-FCBR /100ML	200
7/27/93 10:08	31616	FEC COLIMFM-FCBR /100ML	300
7/27/93 10:03	31616	FEC COLIMFM-FCBR /100ML	400
7/22/93 9:50	31616	FEC COLIMFM-FCBR /100ML	200
7/22/93 9:41	31616	FEC COLIMFM-FCBR /100ML	500
7/20/93 11:59	31616	FEC COLIMFM-FCBR /100ML	3000
7/13/93 9:42	31616	FEC COLIMFM-FCBR /100ML	2400
7/8/93 12:24	31616	FEC COLIMFM-FCBR /100ML	700
7/1/93 11:06	31616	FEC COLIMFM-FCBR /100ML	1200
6/23/93 8:54	31616	FEC COLIMFM-FCBR /100ML	1800
6/14/93 12:06	31616	FEC COLIMFM-FCBR /100ML	2200
6/10/93 8:59	31616	FEC COLIMFM-FCBR /100ML	2100
6/9/93 11:30	31616	FEC COLIMFM-FCBR /100ML	200
6/9/93 11:26	31616	FEC COLIMFM-FCBR /100ML	800
6/2/93 9:58	31616	FEC COLIMFM-FCBR /100ML	1000
5/20/93 12:20	31616	FEC COLIMFM-FCBR /100ML	600
5/13/93 11:05	31616	FEC COLIMFM-FCBR /100ML	100

5/10/93 13:57	31616	FEC COLIMFM-FCBR /100ML	100
5/6/93 12:00	31616	FEC COLIMFM-FCBR /100ML	400
4/29/93 9:55	31616	FEC COLIMFM-FCBR /100ML	100
4/28/93 10:02	31616	FEC COLIMFM-FCBR /100ML	100
4/19/93 10:20	31616	FEC COLIMFM-FCBR /100ML	100
9/29/92 12:17	31616	FEC COLIMFM-FCBR /100ML	400
9/21/92 13:30	31616	FEC COLIMFM-FCBR /100ML	400
9/21/92 13:03	31616	FEC COLIMFM-FCBR /100ML	200
9/16/92 14:26	31616	FEC COLIMFM-FCBR /100ML	100
8/31/92 9:35	31616	FEC COLIMFM-FCBR /100ML	200
8/27/92 13:05	31616	FEC COLIMFM-FCBR /100ML	700
8/25/92 12:48	31616	FEC COLIMFM-FCBR /100ML	100
8/18/92 10:13	31616	FEC COLIMFM-FCBR /100ML	900
8/11/92 13:05	31616	FEC COLIMFM-FCBR /100ML	100
8/5/92 9:37	31616	FEC COLIMFM-FCBR /100ML	100
7/29/92 11:55	31616	FEC COLIMFM-FCBR /100ML	300
7/22/92 12:11	31616	FEC COLIMFM-FCBR /100ML	1000
7/13/92 11:30	31616	FEC COLIMFM-FCBR /100ML	100
7/8/92 9:44	31616	FEC COLIMFM-FCBR /100ML	300
7/8/92 9:35	31616	FEC COLIMFM-FCBR /100ML	400
6/24/92 10:05	31616	FEC COLIMFM-FCBR /100ML	300
6/15/92 9:00	31616	FEC COLIMFM-FCBR /100ML	1300
6/9/92 9:10	31616	FEC COLIMFM-FCBR /100ML	700
6/2/92 9:50	31616	FEC COLIMFM-FCBR /100ML	400
6/2/92 9:40	31616	FEC COLIMFM-FCBR /100ML	300
5/27/92 9:55	31616	FEC COLIMFM-FCBR /100ML	500
5/21/92 9:40	31616	FEC COLIMFM-FCBR /100ML	100
5/11/92 9:30	31616	FEC COLIMFM-FCBR /100ML	100
5/6/92 10:08	31616	FEC COLIMFM-FCBR /100ML	2000
4/30/92 9:15	31616	FEC COLIMFM-FCBR /100ML	1300
8/12/91 13:15	31616	FEC COLIMFM-FCBR /100ML	500
8/6/91 9:20	31616	FEC COLIMFM-FCBR /100ML	4200
7/29/91 9:40	31616	FEC COLIMFM-FCBR /100ML	4000
7/17/91 9:10	31616	FEC COLIMFM-FCBR /100ML	500
7/17/91 8:55	31616	FEC COLIMFM-FCBR /100ML	700
7/8/91 14:25	31616	FEC COLIMFM-FCBR /100ML	300
7/2/91 9:25	31616	FEC COLIMFM-FCBR /100ML	800
6/24/91 12:40	31616	FEC COLIMFM-FCBR /100ML	1400
6/20/91 9:00	31616	FEC COLIMFM-FCBR /100ML	600
6/10/91 9:10	31616	FEC COLIMFM-FCBR /100ML	400
6/5/91 11:30	31616	FEC COLIMFM-FCBR /100ML	100
5/28/91 10:20	31616	FEC COLIMFM-FCBR /100ML	1700
5/28/91 10:00	31616	FEC COLIMFM-FCBR /100ML	600

Stream Name: Maggodee Creek
 Station ID: 4AMEE021.13
 Station Description: Route 613 Bridge
 Latitude: 37° 8' 45"
 Longitude: 80° 0' 34"
 Watershed Code: VAW-L09R

APPENDIX C

EFFLUENT INFORMATION

DMR DATA SUMMARIES

FLOW
pH
BOD
TSS
TRC

DAILY EFFLUENT DATA

pH
TEMPERATURE

Parameter Code	Parameter Description	Due Date	Quantity Average	Quantity Maximum
001	FLOW	10-Jun-2010	.017	.017
001	FLOW	10-May-2010	NULL	NULL
001	FLOW	10-Apr-2010	NULL	NULL
001	FLOW	10-Mar-2010	.017	.017
001	FLOW	10-Feb-2010	NULL	NULL
001	FLOW	10-Jan-2010	NULL	NULL
001	FLOW	10-Dec-2009	.017	.017
001	FLOW	10-Nov-2009	NULL	NULL
001	FLOW	10-Oct-2009	.017	.017
001	FLOW	10-Sep-2009	NULL	NULL
001	FLOW	10-Aug-2009	NULL	NULL
001	FLOW	10-Jul-2009	NULL	NULL
001	FLOW	10-Jun-2009	.017	.017
001	FLOW	10-May-2009	NULL	NULL
001	FLOW	10-Apr-2009	.017	.017
001	FLOW	10-Mar-2009	NULL	NULL
001	FLOW	10-Feb-2009	NULL	NULL
001	FLOW	10-Jan-2009	NULL	NULL
001	FLOW	10-Dec-2008	0.017	0.017
001	FLOW	10-Nov-2008	NULL	NULL
001	FLOW	10-Oct-2008	NULL	NULL
001	FLOW	10-Sep-2008	NULL	NULL
001	FLOW	10-Aug-2008	NULL	NULL
001	FLOW	10-Jul-2008	NULL	NULL
001	FLOW	10-Jun-2008	0.017	0.017
001	FLOW	10-May-2008	0.017	0.017
001	FLOW	10-Apr-2008	NULL	NULL
001	FLOW	10-Mar-2008	NULL	NULL
001	FLOW	10-Feb-2008	NULL	NULL
001	FLOW	10-Jan-2008	NULL	NULL
001	FLOW	10-Dec-2007	0.017	0.017
001	FLOW	10-Nov-2007	NULL	NULL
001	FLOW	10-Oct-2007	NULL	NULL
001	FLOW	10-Sep-2007	NULL	NULL
001	FLOW	10-Aug-2007	NULL	NULL
001	FLOW	10-Jul-2007	NULL	NULL
001	FLOW	10-Jun-2007	0.017	0.017
001	FLOW	10-May-2007	NULL	NULL
001	FLOW	10-Apr-2007	0.017	0.017
001	FLOW	10-Mar-2007	NULL	NULL
001	FLOW	10-Feb-2007	NULL	NULL
001	FLOW	10-Jan-2007	0.017	0.017
001	FLOW	10-Dec-2006	NULL	NULL
001	FLOW	10-Nov-2006	NULL	NULL
001	FLOW	10-Oct-2006	NULL	NULL
001	FLOW	10-Sep-2006	NULL	NULL
001	FLOW	10-Aug-2006	0.017	0.017
001	FLOW	10-Jul-2006	NULL	NULL
001	FLOW	10-Jun-2006	0.017	0.017
001	FLOW	10-May-2006	NULL	NULL
001	FLOW	10-Apr-2006	NULL	NULL
001	FLOW	10-Mar-2006	NULL	NULL
001	FLOW	10-Feb-2006	0.017	0.017
		max	0.017	0.017
		average	0.017	0.017

Parameter Code	Parameter Description	Due Date	Concentration Minimum	Concentration Maximum
002	PH	10-Jun-2010	8.8	8.8
002	PH	10-May-2010	NULL	NULL
002	PH	10-Apr-2010	NULL	NULL
002	PH	10-Mar-2010	8.5	8.8
002	PH	10-Feb-2010	NULL	NULL
002	PH	10-Jan-2010	NULL	NULL
002	PH	10-Dec-2009	8.6	8.8
002	PH	10-Nov-2009	NULL	NULL
002	PH	10-Oct-2009	8.7	8.8
002	PH	10-Sep-2009	NULL	NULL
002	PH	10-Aug-2009	NULL	NULL
002	PH	10-Jul-2009	NULL	NULL
002	PH	10-Jun-2009	8.6	8.8
002	PH	10-May-2009	NULL	NULL
002	PH	10-Apr-2009	8.5	8.8
002	PH	10-Mar-2009	NULL	NULL
002	PH	10-Feb-2009	NULL	NULL
002	PH	10-Jan-2009	NULL	NULL
002	PH	10-Dec-2008	8.0	8.3
002	PH	10-Nov-2008	NULL	NULL
002	PH	10-Oct-2008	NULL	NULL
002	PH	10-Sep-2008	NULL	NULL
002	PH	10-Aug-2008	NULL	NULL
002	PH	10-Jul-2008	NULL	NULL
002	PH	10-Jun-2008	8.6	8.9
002	PH	10-May-2008	7.6	7.8
002	PH	10-Apr-2008	NULL	NULL
002	PH	10-Mar-2008	NULL	NULL
002	PH	10-Feb-2008	NULL	NULL
002	PH	10-Jan-2008	NULL	NULL
002	PH	10-Dec-2007	8.0	8.3
002	PH	10-Nov-2007	NULL	NULL
002	PH	10-Oct-2007	NULL	NULL
002	PH	10-Sep-2007	NULL	NULL
002	PH	10-Aug-2007	NULL	NULL
002	PH	10-Jul-2007	NULL	NULL
002	PH	10-Jun-2007	7.5	7.6
002	PH	10-May-2007	NULL	NULL
002	PH	10-Apr-2007	7.5	7.6
002	PH	10-Mar-2007	NULL	NULL
002	PH	10-Feb-2007	NULL	NULL
002	PH	10-Jan-2007	7.2	7.3
002	PH	10-Dec-2006	NULL	NULL
002	PH	10-Nov-2006	NULL	NULL
002	PH	10-Oct-2006	NULL	NULL
002	PH	10-Sep-2006	NULL	NULL
002	PH	10-Aug-2006	7.2	7.6
002	PH	10-Jul-2006	NULL	NULL
002	PH	10-Jun-2006	8.3	9.2
002	PH	10-May-2006	NULL	NULL
002	PH	10-Apr-2006	NULL	NULL
002	PH	10-Mar-2006	NULL	NULL
002	PH	10-Feb-2006	7.1	7.1
no reduced monitoring - values within 0.5 units of max pH limit			limit = 6.0	limit = 9.0
				90% max = 8.85
				10% max = 7.45

Parameter Code	Parameter Description	Due Date	Quantity Average	Quantity Maximum	Concentration Average	Concentration Maximum
003	BOD5	10-Jun-2010	<QL	<QL	<QL	<QL
003	BOD5	10-May-2010	NULL	NULL	NULL	NULL
003	BOD5	10-Apr-2010	NULL	NULL	NULL	NULL
003	BOD5	10-Mar-2010	<QL	<QL	<QL	<QL
003	BOD5	10-Feb-2010	NULL	NULL	NULL	NULL
003	BOD5	10-Jan-2010	NULL	NULL	NULL	NULL
003	BOD5	10-Dec-2009	<QL	<QL	<QL	<QL
003	BOD5	10-Nov-2009	NULL	NULL	NULL	NULL
003	BOD5	10-Oct-2009	<QL	<QL	<QL	<QL
003	BOD5	10-Sep-2009	NULL	NULL	NULL	NULL
003	BOD5	10-Aug-2009	NULL	NULL	NULL	NULL
003	BOD5	10-Jul-2009	NULL	NULL	NULL	NULL
003	BOD5	10-Jun-2009	<QL	<QL	<QL	<QL
003	BOD5	10-May-2009	NULL	NULL	NULL	NULL
003	BOD5	10-Apr-2009	.90	.90	14	14
003	BOD5	10-Mar-2009	NULL	NULL	NULL	NULL
003	BOD5	10-Feb-2009	NULL	NULL	NULL	NULL
003	BOD5	10-Jan-2009	NULL	NULL	NULL	NULL
003	BOD5	10-Dec-2008	<QL	<QL	<QL	<QL
003	BOD5	10-Nov-2008	NULL	NULL	NULL	NULL
003	BOD5	10-Oct-2008	NULL	NULL	NULL	NULL
003	BOD5	10-Sep-2008	NULL	NULL	NULL	NULL
003	BOD5	10-Aug-2008	NULL	NULL	NULL	NULL
003	BOD5	10-Jul-2008	NULL	NULL	NULL	NULL
003	BOD5	10-Jun-2008	14.15	14.15	220	220
003	BOD5	10-May-2008	<QL	<QL	<QL	<QL
003	BOD5	10-Apr-2008	NULL	NULL	NULL	NULL
003	BOD5	10-Mar-2008	NULL	NULL	NULL	NULL
003	BOD5	10-Feb-2008	NULL	NULL	NULL	NULL
003	BOD5	10-Jan-2008	NULL	NULL	NULL	NULL
003	BOD5	10-Dec-2007	0.19	0.19	3	3
003	BOD5	10-Nov-2007	NULL	NULL	NULL	NULL
003	BOD5	10-Oct-2007	NULL	NULL	NULL	NULL
003	BOD5	10-Sep-2007	NULL	NULL	NULL	NULL
003	BOD5	10-Aug-2007	NULL	NULL	NULL	NULL
003	BOD5	10-Jul-2007	NULL	NULL	NULL	NULL
003	BOD5	10-Jun-2007	2.0	2.0	32	32
003	BOD5	10-May-2007	NULL	NULL	NULL	NULL
003	BOD5	10-Apr-2007	0.32	0.32	5	5
003	BOD5	10-Mar-2007	NULL	NULL	NULL	NULL
003	BOD5	10-Feb-2007	NULL	NULL	NULL	NULL
003	BOD5	10-Jan-2007	0.57	0.57	9	9
003	BOD5	10-Dec-2006	NULL	NULL	NULL	NULL
003	BOD5	10-Nov-2006	NULL	NULL	NULL	NULL
003	BOD5	10-Oct-2006	NULL	NULL	NULL	NULL
003	BOD5	10-Sep-2006	NULL	NULL	NULL	NULL
003	BOD5	10-Aug-2006	1.09	1.09	17	17
003	BOD5	10-Jul-2006	NULL	NULL	NULL	NULL
003	BOD5	10-Jun-2006	1.41	1.41	22	22
003	BOD5	10-May-2006	NULL	NULL	NULL	NULL
003	BOD5	10-Apr-2006	NULL	NULL	NULL	NULL
003	BOD5	10-Mar-2006	NULL	NULL	NULL	NULL
003	BOD5	10-Feb-2006	0.38	0.38	6	6
			average = 1.31	average = 1.31	average = 20.50	average = 20.50
no reduced monitoring			limit = 3.4	limit = 5.1	limit = 30	limit = 45
68% "reduces" to 1/month			average/limit = 0.39	average/limit = 0.26	average/limit = 0.68	average/limit = 0.46

Parameter Code	Parameter Description	Due Date	Quantity Average	Quantity Maximum	Concentration Average	Concentration Maximum
004	TSS	10-Jun-2010	0.70	0.70	11	11
004	TSS	10-May-2010	NULL	NULL	NULL	NULL
004	TSS	10-Apr-2010	NULL	NULL	NULL	NULL
004	TSS	10-Mar-2010	0.77	0.77	12	12
004	TSS	10-Feb-2010	NULL	NULL	NULL	NULL
004	TSS	10-Jan-2010	NULL	NULL	NULL	NULL
004	TSS	10-Dec-2009	0.77	0.77	12	12
004	TSS	10-Nov-2009	NULL	NULL	NULL	NULL
004	TSS	10-Oct-2009	.57	.57	9	9
004	TSS	10-Sep-2009	NULL	NULL	NULL	NULL
004	TSS	10-Aug-2009	NULL	NULL	NULL	NULL
004	TSS	10-Jul-2009	NULL	NULL	NULL	NULL
004	TSS	10-Jun-2009	1.02	1.02	16	16
004	TSS	10-May-2009	NULL	NULL	NULL	NULL
004	TSS	10-Apr-2009	1.22	1.22	19	19
004	TSS	10-Mar-2009	NULL	NULL	NULL	NULL
004	TSS	10-Feb-2009	NULL	NULL	NULL	NULL
004	TSS	10-Jan-2009	NULL	NULL	NULL	NULL
004	TSS	10-Dec-2008	0.19	0.19	3	3
004	TSS	10-Nov-2008	NULL	NULL	NULL	NULL
004	TSS	10-Oct-2008	NULL	NULL	NULL	NULL
004	TSS	10-Sep-2008	NULL	NULL	NULL	NULL
004	TSS	10-Aug-2008	NULL	NULL	NULL	NULL
004	TSS	10-Jul-2008	NULL	NULL	NULL	NULL
004	TSS	10-Jun-2008	2.12	2.12	33	33
004	TSS	10-May-2008	0.12	0.12	2	2
004	TSS	10-Apr-2008	NULL	NULL	NULL	NULL
004	TSS	10-Mar-2008	NULL	NULL	NULL	NULL
004	TSS	10-Feb-2008	NULL	NULL	NULL	NULL
004	TSS	10-Jan-2008	NULL	NULL	NULL	NULL
004	TSS	10-Dec-2007	0.90	0.90	14	14
004	TSS	10-Nov-2007	NULL	NULL	NULL	NULL
004	TSS	10-Oct-2007	NULL	NULL	NULL	NULL
004	TSS	10-Sep-2007	NULL	NULL	NULL	NULL
004	TSS	10-Aug-2007	NULL	NULL	NULL	NULL
004	TSS	10-Jul-2007	NULL	NULL	NULL	NULL
004	TSS	10-Jun-2007	2.3	2.3	36	36
004	TSS	10-May-2007	NULL	NULL	NULL	NULL
004	TSS	10-Apr-2007	0.32	0.32	5	5
004	TSS	10-Mar-2007	NULL	NULL	NULL	NULL
004	TSS	10-Feb-2007	NULL	NULL	NULL	NULL
004	TSS	10-Jan-2007	0.45	0.45	7	7
004	TSS	10-Dec-2006	NULL	NULL	NULL	NULL
004	TSS	10-Nov-2006	NULL	NULL	NULL	NULL
004	TSS	10-Oct-2006	NULL	NULL	NULL	NULL
004	TSS	10-Sep-2006	NULL	NULL	NULL	NULL
004	TSS	10-Aug-2006	1.93	1.93	30	30
004	TSS	10-Jul-2006	NULL	NULL	NULL	NULL
004	TSS	10-Jun-2006	1.22	1.22	19	19
004	TSS	10-May-2006	NULL	NULL	NULL	NULL
004	TSS	10-Apr-2006	NULL	NULL	NULL	NULL
004	TSS	10-Mar-2006	NULL	NULL	NULL	NULL
004	TSS	10-Feb-2006	0.64	0.64	10	10
			average = 0.95	average = 0.95	average = 14.88	average = 14.88
			limit = 3.4	limit = 5.1	limit = 30	limit = 45
			average/limit = 0.28	average/limit = 0.19	average/limit = 0.50	average/limit = 0.33

Parameter Code	Parameter Description	Due Date	Concentration Minimum
157	CL2, TOTAL CONTACT	10-Jun-2010	1.19
157	CL2, TOTAL CONTACT	10-May-2010	NULL
157	CL2, TOTAL CONTACT	10-Apr-2010	NULL
157	CL2, TOTAL CONTACT	10-Mar-2010	1.38
157	CL2, TOTAL CONTACT	10-Feb-2010	NULL
157	CL2, TOTAL CONTACT	10-Jan-2010	NULL
157	CL2, TOTAL CONTACT	10-Dec-2009	1.18
157	CL2, TOTAL CONTACT	10-Nov-2009	NULL
157	CL2, TOTAL CONTACT	10-Oct-2009	1.10
157	CL2, TOTAL CONTACT	10-Sep-2009	NULL
157	CL2, TOTAL CONTACT	10-Aug-2009	NULL
157	CL2, TOTAL CONTACT	10-Jul-2009	NULL
157	CL2, TOTAL CONTACT	10-Jun-2009	1.40
157	CL2, TOTAL CONTACT	10-May-2009	NULL
157	CL2, TOTAL CONTACT	10-Apr-2009	1.35
157	CL2, TOTAL CONTACT	10-Mar-2009	NULL
157	CL2, TOTAL CONTACT	10-Feb-2009	NULL
157	CL2, TOTAL CONTACT	10-Jan-2009	NULL
157	CL2, TOTAL CONTACT	10-Dec-2008	1.48
157	CL2, TOTAL CONTACT	10-Nov-2008	NULL
157	CL2, TOTAL CONTACT	10-Oct-2008	NULL
157	CL2, TOTAL CONTACT	10-Sep-2008	NULL
157	CL2, TOTAL CONTACT	10-Aug-2008	NULL
157	CL2, TOTAL CONTACT	10-Jul-2008	NULL
157	CL2, TOTAL CONTACT	10-Jun-2008	1.23
157	CL2, TOTAL CONTACT	10-May-2008	1.5
157	CL2, TOTAL CONTACT	10-Apr-2008	NULL
157	CL2, TOTAL CONTACT	10-Mar-2008	NULL
157	CL2, TOTAL CONTACT	10-Feb-2008	NULL
157	CL2, TOTAL CONTACT	10-Jan-2008	NULL
157	CL2, TOTAL CONTACT	10-Dec-2007	1.5
157	CL2, TOTAL CONTACT	10-Nov-2007	NULL
157	CL2, TOTAL CONTACT	10-Oct-2007	NULL
157	CL2, TOTAL CONTACT	10-Sep-2007	NULL
157	CL2, TOTAL CONTACT	10-Aug-2007	NULL
157	CL2, TOTAL CONTACT	10-Jul-2007	NULL
157	CL2, TOTAL CONTACT	10-Jun-2007	1.5
157	CL2, TOTAL CONTACT	10-May-2007	NULL
157	CL2, TOTAL CONTACT	10-Apr-2007	1.5
157	CL2, TOTAL CONTACT	10-Mar-2007	NULL
157	CL2, TOTAL CONTACT	10-Feb-2007	NULL
157	CL2, TOTAL CONTACT	10-Jan-2007	1.7
157	CL2, TOTAL CONTACT	10-Dec-2006	NULL
157	CL2, TOTAL CONTACT	10-Nov-2006	NULL
157	CL2, TOTAL CONTACT	10-Oct-2006	NULL
157	CL2, TOTAL CONTACT	10-Sep-2006	NULL
157	CL2, TOTAL CONTACT	10-Aug-2006	1.6
157	CL2, TOTAL CONTACT	10-Jul-2006	NULL
157	CL2, TOTAL CONTACT	10-Jun-2006	1.6
157	CL2, TOTAL CONTACT	10-May-2006	NULL
157	CL2, TOTAL CONTACT	10-Apr-2006	NULL
157	CL2, TOTAL CONTACT	10-Mar-2006	NULL
157	CL2, TOTAL CONTACT	10-Feb-2006	1.5
chlorine not eligible for reduced monitoring		limit = 1.0 (minimum)	

Parameter Code	Parameter Description	Due Date	Concentration Average	Concentration Maximum
165	CL2, INST RES MAX	10-Jun-2010	<QL	<QL
165	CL2, INST RES MAX	10-May-2010	NULL	NULL
165	CL2, INST RES MAX	10-Apr-2010	NULL	NULL
165	CL2, INST RES MAX	10-Mar-2010	<QL	<QL
165	CL2, INST RES MAX	10-Feb-2010	NULL	NULL
165	CL2, INST RES MAX	10-Jan-2010	NULL	NULL
165	CL2, INST RES MAX	10-Dec-2009	<QL	<QL
165	CL2, INST RES MAX	10-Nov-2009	NULL	NULL
165	CL2, INST RES MAX	10-Oct-2009	<QL	<QL
165	CL2, INST RES MAX	10-Sep-2009	NULL	NULL
165	CL2, INST RES MAX	10-Aug-2009	NULL	NULL
165	CL2, INST RES MAX	10-Jul-2009	NULL	NULL
165	CL2, INST RES MAX	10-Jun-2009	<QL	<QL
165	CL2, INST RES MAX	10-May-2009	NULL	NULL
165	CL2, INST RES MAX	10-Apr-2009	<QL	<QL
165	CL2, INST RES MAX	10-Mar-2009	NULL	NULL
165	CL2, INST RES MAX	10-Feb-2009	NULL	NULL
165	CL2, INST RES MAX	10-Jan-2009	NULL	NULL
165	CL2, INST RES MAX	10-Dec-2008	<QL	<QL
165	CL2, INST RES MAX	10-Nov-2008	NULL	NULL
165	CL2, INST RES MAX	10-Oct-2008	NULL	NULL
165	CL2, INST RES MAX	10-Sep-2008	NULL	NULL
165	CL2, INST RES MAX	10-Aug-2008	NULL	NULL
165	CL2, INST RES MAX	10-Jul-2008	NULL	NULL
165	CL2, INST RES MAX	10-Jun-2008	0.04	0.05
165	CL2, INST RES MAX	10-May-2008	<QL	<QL
165	CL2, INST RES MAX	10-Apr-2008	NULL	NULL
165	CL2, INST RES MAX	10-Mar-2008	NULL	NULL
165	CL2, INST RES MAX	10-Feb-2008	NULL	NULL
165	CL2, INST RES MAX	10-Jan-2008	NULL	NULL
165	CL2, INST RES MAX	10-Dec-2007	<QL	<QL
165	CL2, INST RES MAX	10-Nov-2007	NULL	NULL
165	CL2, INST RES MAX	10-Oct-2007	NULL	NULL
165	CL2, INST RES MAX	10-Sep-2007	NULL	NULL
165	CL2, INST RES MAX	10-Aug-2007	NULL	NULL
165	CL2, INST RES MAX	10-Jul-2007	NULL	NULL
165	CL2, INST RES MAX	10-Jun-2007	<QL	<QL
165	CL2, INST RES MAX	10-May-2007	NULL	NULL
165	CL2, INST RES MAX	10-Apr-2007	<QL	<QL
165	CL2, INST RES MAX	10-Mar-2007	NULL	NULL
165	CL2, INST RES MAX	10-Feb-2007	NULL	NULL
165	CL2, INST RES MAX	10-Jan-2007	0.02	0.04
165	CL2, INST RES MAX	10-Dec-2006	NULL	NULL
165	CL2, INST RES MAX	10-Nov-2006	NULL	NULL
165	CL2, INST RES MAX	10-Oct-2006	NULL	NULL
165	CL2, INST RES MAX	10-Sep-2006	NULL	NULL
165	CL2, INST RES MAX	10-Aug-2006	0.02	0.04
165	CL2, INST RES MAX	10-Jul-2006	NULL	NULL
165	CL2, INST RES MAX	10-Jun-2006	0.03	0.04
165	CL2, INST RES MAX	10-May-2006	NULL	NULL
165	CL2, INST RES MAX	10-Apr-2006	NULL	NULL
165	CL2, INST RES MAX	10-Mar-2006	NULL	NULL
165	CL2, INST RES MAX	10-Feb-2006	0.02	0.04
chlorine not eligible for reduced monitoring			limit = 0.11	limit = 0.13

Parameter Code	Parameter Description	Due Date	Concentration Minimum
213	CL2, INST TECH MIN LIMIT	10-Jun-2010	1.19
213	CL2, INST TECH MIN LIMIT	10-May-2010	NULL
213	CL2, INST TECH MIN LIMIT	10-Apr-2010	NULL
213	CL2, INST TECH MIN LIMIT	10-Mar-2010	1.38
213	CL2, INST TECH MIN LIMIT	10-Feb-2010	NULL
213	CL2, INST TECH MIN LIMIT	10-Jan-2010	NULL
213	CL2, INST TECH MIN LIMIT	10-Dec-2009	1.18
213	CL2, INST TECH MIN LIMIT	10-Nov-2009	NULL
213	CL2, INST TECH MIN LIMIT	10-Oct-2009	1.10
213	CL2, INST TECH MIN LIMIT	10-Sep-2009	NULL
213	CL2, INST TECH MIN LIMIT	10-Aug-2009	NULL
213	CL2, INST TECH MIN LIMIT	10-Jul-2009	NULL
213	CL2, INST TECH MIN LIMIT	10-Jun-2009	1.40
213	CL2, INST TECH MIN LIMIT	10-May-2009	NULL
213	CL2, INST TECH MIN LIMIT	10-Apr-2009	1.35
213	CL2, INST TECH MIN LIMIT	10-Mar-2009	NULL
213	CL2, INST TECH MIN LIMIT	10-Feb-2009	NULL
213	CL2, INST TECH MIN LIMIT	10-Jan-2009	NULL
213	CL2, INST TECH MIN LIMIT	10-Dec-2008	1.48
213	CL2, INST TECH MIN LIMIT	10-Nov-2008	NULL
213	CL2, INST TECH MIN LIMIT	10-Oct-2008	NULL
213	CL2, INST TECH MIN LIMIT	10-Sep-2008	NULL
213	CL2, INST TECH MIN LIMIT	10-Aug-2008	NULL
213	CL2, INST TECH MIN LIMIT	10-Jul-2008	NULL
213	CL2, INST TECH MIN LIMIT	10-Jun-2008	1.23
213	CL2, INST TECH MIN LIMIT	10-May-2008	1.5
213	CL2, INST TECH MIN LIMIT	10-Apr-2008	NULL
213	CL2, INST TECH MIN LIMIT	10-Mar-2008	NULL
213	CL2, INST TECH MIN LIMIT	10-Feb-2008	NULL
213	CL2, INST TECH MIN LIMIT	10-Jan-2008	NULL
213	CL2, INST TECH MIN LIMIT	10-Dec-2007	1.5
213	CL2, INST TECH MIN LIMIT	10-Nov-2007	NULL
213	CL2, INST TECH MIN LIMIT	10-Oct-2007	NULL
213	CL2, INST TECH MIN LIMIT	10-Sep-2007	NULL
213	CL2, INST TECH MIN LIMIT	10-Aug-2007	NULL
213	CL2, INST TECH MIN LIMIT	10-Jul-2007	NULL
213	CL2, INST TECH MIN LIMIT	10-Jun-2007	1.5
213	CL2, INST TECH MIN LIMIT	10-May-2007	NULL
213	CL2, INST TECH MIN LIMIT	10-Apr-2007	1.5
213	CL2, INST TECH MIN LIMIT	10-Mar-2007	NULL
213	CL2, INST TECH MIN LIMIT	10-Feb-2007	NULL
213	CL2, INST TECH MIN LIMIT	10-Jan-2007	1.7
213	CL2, INST TECH MIN LIMIT	10-Dec-2006	NULL
213	CL2, INST TECH MIN LIMIT	10-Nov-2006	NULL
213	CL2, INST TECH MIN LIMIT	10-Oct-2006	NULL
213	CL2, INST TECH MIN LIMIT	10-Sep-2006	NULL
213	CL2, INST TECH MIN LIMIT	10-Aug-2006	1.6
213	CL2, INST TECH MIN LIMIT	10-Jul-2006	NULL
213	CL2, INST TECH MIN LIMIT	10-Jun-2006	1.6
213	CL2, INST TECH MIN LIMIT	10-May-2006	NULL
213	CL2, INST TECH MIN LIMIT	10-Apr-2006	NULL
213	CL2, INST TECH MIN LIMIT	10-Mar-2006	NULL
213	CL2, INST TECH MIN LIMIT	10-Feb-2006	1.5
chlorine not eligible for reduced monitoring			limit = 0.6 (minimum)

Boones Mill STP
Daily Effluent pH
January 2006 through May 2010

90% maximum pH = 8.8 SU 10% maximum pH = 7.2 SU

Day	Jan 2006	May 2006	July 2006	Dec 2006	Mar 2007	May 2007	Nov 2007	Apr 2008	May 2008	Nov 2008	Mar 2009	May 2009	Sept 2009	Nov 2009	Feb 2010	May 2010	Day
1		9.2		7.2			7.6		8.3		8.7		8.8		8.8		1
2		8.9		7.2			7.6		8.3		8.7		8.8		8.8		2
3	7.15	9.2		7.2			7.6		8.3		8.7		8.8		8.8		3
4	7.12	8.9		7.2			7.6		8.3		8.8		8.8		8.8		4
5	7.16	8.9	7.4	7.2	7.6		7.6		8.3	8.8							5
6	7.12	8.8	7.5	7.2	7.6		7.6		8.3	8.7							6
7	7.12	8.9	7.6	7.2	7.5		7.6		8.3	8.7							7
8	7.16	8.7	7.4	7.3	7.5		7.6		8.2	8.7							8
9	7.16	8.8	7.4	7.2	7.5		7.6		8.2	8.8							9
10	7.13	8.8	7.2	7.2	7.5		7.6		8.3	8.8							10
11	7.15	8.7	7.2	7.3	7.5		7.6		8.3	8.8							11
12	7.12	8.7	7.5	7.3	7.5		8.2		8.3	8.8							12
13	7.12	8.8	7.6	7.3	7.5		8.2		8.3	8.8							13
14	7.13	8.7	7.4	7.2	7.5		8.2		8.1	8.8							14
15	7.12	8.6	7.4	7.2	7.5		8.2		8.1	8.8							15
16	7.15	8.7		7.2	7.5		8.2		8.0	8.8							16
17	7.12			7.2	7.5		8.2		8.0	8.7							17
18				7.2	7.5		8.2		8.8	8.0							18
19	7.13			7.2	7.6		7.5		8.3	7.8							19
20	7.15			7.2	7.6		7.5		8.3	7.8							20
21	7.12			7.2	7.6		7.5		8.3								21
22	7.17			7.2	7.6		7.5		8.3								22
23	7.15			7.2	7.5		8.2		8.8								23
24	7.12			7.2	7.6		7.5		8.3								24
25	7.13			7.2	7.6		7.5		8.3								25
26	7.15			7.2	7.6		7.6		8.2								26
27				7.2	7.5		8.1		8.9								27
28				7.3	7.6		8.1		8.6								28
29				7.2	7.6		8.0		8.8								29
30				7.2	7.5		8.0		8.8								30
31					7.5		7.5			8.6							31

Boones Mill STP
Daily Effluent Temperature
January 2006 through May 2010

90% wet season temperature = 19.2°C

Day	Jan 2006	May 2006	July 2006	Dec 2006	Mar 2007	May 2007	Nov 2007	Apr 2008	May 2008	Nov 2008	Mar 2009	May 2009	Sept 2009	May 2010	Nov 2009	Feb 2010	May 2010	Day
1	15.2	10.5					12.9						23.4	12.6				1
2	15.2	10.4					12.8						23.2	12.9				2
3	15.3	8.0					12.9						23.1	13.1				3
4	15.2	6.3					12.8						23.1	13.0				4
5	15.2	5.2	25.2	5.2		15.1							22.9	12.9				5
6	4.9	14.9	25.1	4.7		15.0							22.8	12.6				6
7	4.5	14.5	24.8	5.9		15.2							23.1	12.5				7
8	3.9	14.9	24.9	4.0		15.1							23.4	12.8				8
9	4.7	14.7	25.1	4.0		15.1							23.4	13.0				9
10	5.3	15.3	25.2	4.2		15.1							23.1	13.0				10
11	5.3	15.3	23.9	4.2		15.1							23.2	13.1				11
12	5.2	15.2	23.8	5.5		15.3	8.3						19.0	6.5				12
13	5.0	15.0	24.2	6.9		15.3	8.4						19.1	6.5				13
14	4.6	14.6	24.1	6.7		15.1	8.5						19.2	12.8				14
15	3.5	15.1	23.6	8.5		15.6	8.4						19.1	12.7				15
16	3.2	15.2		8.9		15.6	8.4						19.1	12.7				16
17	3.3			9.4		15.4	8.3						19.1	12.8				17
18	3.2			10.5		15.4	8.3						19.1	12.8				18
19	3.3			10.9		9.2	15.3	8.3					19.0	12.9				19
20	3.3			12.3		9.3	15.1	8.3					19.0	6.7				20
21	3.5			12.8		9.6	15.0	8.3					19.1	13.0				21
22	3.6			11.8		10.5	15.0	8.3					19.2	13.1				22
23	3.3			11.0		10.4	15.3	8.3					19.4	13.3				23
24	3.2			10.0		9.1	15.1	8.3					19.5	13.0				24
25	3.3			10.5		8.8	15.1	8.3					19.5	13.1				25
26	3.4			9.2		8.6							19.5	12.9				26
27				8.8		8.1							19.5	13.0				27
28				6.9		8.8							19.6	13.1				28
29				6.0		8.9							19.4	12.9				29
30				5.7		9.0	15.9	8.1					19.5	13.0				30
31						9.1	16.1						19.0	18.8				31

90% annual temperature = 19.5°C

Boones Mill STP
Daily Effluent Temperature
July 2006 and Sept 2009

Day	July 2006	Sept 2009
1		23.4
2		23.2
3		23.1
4		23.1
5	25.2	22.9
6	25.1	22.8
7	24.8	23.1
8	24.9	23.4
9	25.1	23.4
10	25.2	23.1
11	23.9	23.2
12	23.8	
13	24.2	
14	24.1	
15	23.6	
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		

average 23.8
 90% 25.1
maximum 25.2

APPENDIX D

WATER QUALITY BASED LIMITS ANALYSES

MIXING ZONE PREDICTIONS

WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS SPREADSHEET

STATS OUTPUT

AMMONIA

CHLORINE

Mixing Zone Predictions for Boones Mill STP

Effluent Flow = 0.030 MGD

Stream 7Q10 = 0.30 MGD

Stream 30Q10 = 0.60 MGD

Stream 1Q10 = 0.24 MGD

Stream slope = 0.005 ft/ft

Stream width = 15 ft

Bottom scale = 3

Channel scale = 2

Mixing Zone Predictions @ 7Q10

Depth = .136 ft

Length = 746.04 ft

Velocity = .2503 ft/sec

Residence Time = .0345 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = .2012 ft

Length = 535.37 ft

Velocity = .3231 ft/sec

Residence Time = .0192 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .1205 ft

Length = 826.64 ft

Velocity = .2312 ft/sec

Residence Time = .9931 hours

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.

Mixing Zone Predictions for Boones Mill STP

Effluent Flow = 0.030 MGD
Stream 7Q10 = 2.11 MGD
Stream 30Q10 = 3.22 MGD }
Stream 1Q10 = 1.64 MGD }
Stream slope = 0.005 ft/ft
Stream width = 20 ft
Bottom scale = 3
Channel scale = 2

Mixing Zone Predictions @ 7Q10

Depth = .3535 ft
Length = 592.14 ft
Velocity = .4682 ft/sec
Residence Time = .0146 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = .4564 ft
Length = 475.16 ft
Velocity = .5511 ft/sec
Residence Time = .01 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .3043 ft
Length = 672.66 ft
Velocity = .4248 ft/sec
Residence Time = .4399 hours

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.

WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name:

Boones Mill STP

Permit No.: V-0067245

Receiving Stream:

Maggodee Creek

Version: OWP Guidance Memo 00-2011 (8/24/00)

Parameter (ug/l unless noted)	Background Conc.	Acute	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			Most Limiting Allocations		
			Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenaphthene	0	-	-	na	9.9E+02	-	-	na	3.3E+04	-	-	na	9.9E+01	-	-	na	3.3E+03
Acrolatin	0	-	-	na	9.3E+00	-	-	na	3.1E+02	-	-	na	9.3E+01	-	-	na	3.1E+01
Acrylonitrile ^c	0	-	-	na	2.5E+00	-	-	na	3.5E+02	-	-	na	2.5E+01	-	-	na	3.5E+01
Aldrin C	0	3.0E+00	-	na	5.0E-04	2.7E+01	-	na	7.0E-02	7.5E-01	-	na	5.0E-05	6.8E+00	-	na	7.0E-03
Ammonia-N (mg/l) (Yearly)	0	4.33E+00	7.67E-01	na	-	3.9E+01	1.6E+01	na	-	1.08E+00	1.92E-01	na	-	9.7E+00	4.0E+00	na	-
Ammonia-N (mg/l) (High Flow)	0	4.58E+00	1.03E+00	na	-	2.5E+02	1.1E+02	na	-	1.14E+00	2.57E-01	na	-	6.4E+01	2.8E+01	na	-
Anthracene	0	-	na	4.0E+04	-	-	na	1.3E+06	-	-	na	4.0E+03	-	-	na	1.3E+05	
Antimony	0	-	na	6.4E+02	-	-	na	2.1E+04	-	-	na	6.4E+01	-	-	na	2.1E+03	
Arsenic	0	3.4E+02	1.5E+02	na	-	3.1E+03	1.7E+03	na	-	8.5E+01	3.8E+01	na	-	7.7E+02	4.1E+02	na	-
Barium	0	-	na	-	-	-	-	na	-	-	na	-	-	-	na	-	
Benzene c	0	-	na	5.1E+02	-	-	na	7.1E+04	-	-	na	5.1E+01	-	-	na	7.1E+03	
Benzidine c	0	-	na	2.0E+03	-	-	na	2.8E+01	-	-	na	2.0E+04	-	-	na	2.8E+02	
Benzo (a) anthracene c	0	-	na	1.8E+01	-	-	na	2.5E+01	-	-	na	1.8E+02	-	-	na	2.5E+00	
Benzo (b) fluoranthene c	0	-	na	1.8E+01	-	-	na	2.5E+01	-	-	na	1.8E+02	-	-	na	2.5E+00	
Benzo (k) fluoranthene c	0	-	na	1.8E+01	-	-	na	2.5E+01	-	-	na	1.8E+02	-	-	na	2.5E+00	
Benzo (a) pyrene c	0	-	na	1.4E+03	-	-	na	2.0E+05	-	-	na	1.4E+02	-	-	na	3.1E+00	
Bis(2-Chloroethyl) Ether ^c	0	-	na	5.3E+00	-	-	na	7.4E+02	-	-	na	5.3E+01	-	-	na	7.4E+01	
Bis 2-Chloroisopropyl Ether	0	-	na	6.5E+04	-	-	na	2.1E+06	-	-	na	6.5E+03	-	-	na	2.1E+05	
Bis 2-Ethylhexyl Phthalate ^c	0	-	na	2.2E+01	-	-	na	3.1E+03	-	-	na	2.2E+00	-	-	na	3.1E+02	
Bromoform c	0	-	na	1.4E+03	-	-	na	2.0E+05	-	-	na	1.4E+02	-	-	na	2.0E+04	
Butylbenzylphthalate	0	-	na	1.9E+03	-	-	na	6.3E+04	-	-	na	1.9E+02	-	-	na	6.3E+03	
Cadmium	0	9.5E-01	4.2E-01	na	-	8.5E+00	4.6E+00	na	-	2.4E-01	1.0E-01	na	-	2.1E+00	1.2E+00	na	-
Carbon Tetrachloride c	0	-	na	1.6E+01	-	-	na	2.2E+03	-	-	na	1.6E+00	-	-	na	2.2E+02	
Chlordane c	0	2.4E+00	4.3E-03	na	8.1E-03	2.2E+01	4.7E-02	na	1.1E+00	6.0E-01	1.1E-03	na	8.1E-04	5.4E+00	1.2E-02	na	1.1E+01
Chloride	0	8.6E+05	2.3E+05	na	-	7.7E+06	2.5E+06	na	-	2.2E+05	5.8E+04	na	-	1.9E+06	6.3E+05	na	-
TRC	0	1.9E+04	1.1E+01	na	-	1.7E+02	1.2E+02	na	-	4.8E+00	2.8E+00	na	-	4.3E+01	3.0E+01	na	-
Chlorobenzene	0	-	na	1.6E+03	-	-	na	5.3E+04	-	-	na	1.6E+02	-	-	na	5.3E+03	

Stream Information			Mixing Information			Effluent Information		
Mean Hardness (as CaCO ₃) =	27 mg/L	0.24 MGD	Annual -1Q10 Mix =	100 %	100 %	Mean Hardness (as CaCO ₃) =	39 mg/L	
90% Temperature (Annual) =	24.8 deg C	0.3 MGD	-7Q10 Mix =	100 %	100 %	90% Temp (Annual) =	19.5 deg C	
90% Temperature (Wet season) =	20.3 deg C	0.6 MGD	-3QQ10 Mix =	100 %	100 %	90% Temp (Wet season) =	19.2 deg C	
90% Maximum pH =	8.31 SU	1.64 MGD	Wet Season -1Q10 Mix =	100 %	100 %	90% Maximum pH =	8.8 SU	
10% Maximum pH =	7.37 SU	3.22 MGD	-3QQ10 Mix =	100 %	100 %	10% Maximum pH =	7.2 SU	
Tier Designation (1 or -2) =	2	0.96 MGD	Discharge Flow =			Discharge Flow =	0.03 MGD	
Public Water Supply (PWS) Y/N? =	n	4.17 MGD						
Trout Present Y/N? =	y							
Early Life Stages Present Y/N? =	y							

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			Most Limiting Allocations			
		Acute	Chronic	H-H (PWS)	Acute	Chronic	H-H (PWS)	Acute	Chronic	H-H (PWS)	Acute	Chronic	H-H (PWS)	Acute	Chronic	H-H (PWS)	
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	5.5E+01	na	1.4E+05	5.0E+00	1.3E+00	na	4.2E+02	4.5E+01	1.4E+01	4.5E+04	1.4E+01	1.4E+04
Silver	0	3.9E-01	—	na	—	3.5E+00	—	—	9.9E-02	—	na	—	8.9E-01	—	—	8.9E-01	—
Sulfate	0	—	—	na	—	—	—	—	—	—	na	—	—	—	—	—	—
1,1,2,2-Tetrachloroethane ^c	0	—	—	na	4.0E+01	—	na	5.6E-03	—	—	na	4.0E+00	—	—	5.6E-02	—	—
Tetrachloroethylene ^c	0	—	—	na	3.3E+01	—	na	4.6E-03	—	—	na	3.3E+00	—	—	4.6E-02	—	—
Thallium	0	—	—	na	4.7E-01	—	na	1.6E+01	—	—	na	4.7E+02	—	—	1.6E+00	—	—
Toluene	0	—	—	na	6.0E+03	—	na	2.0E+05	—	—	na	6.0E+02	—	—	2.0E+04	—	—
Total dissolved solids	0	—	—	na	—	—	na	—	—	na	—	—	—	—	—	—	—
Toxaphene ^c	0	7.3E-01	2.0E-04	na	2.8E-03	6.6E+00	2.2E-03	na	3.9E-01	1.8E-01	5.0E-05	na	2.8E-04	1.6E-00	5.5E-04	na	3.9E-02
Tributyltin	4.6E-01	7.2E-02	—	4.1E+00	7.9E-01	na	—	1.2E-01	1.8E-02	na	—	1.0E+00	2.0E-01	na	1.0E+00	2.0E-01	na
1,2,4-Trichlorobenzene	0	—	—	na	7.0E+01	—	na	2.3E+03	—	—	na	7.0E+00	—	—	2.3E+02	—	—
1,1,2-Trichloroethane ^c	0	—	—	na	1.6E+02	—	na	2.2E+04	—	—	na	1.6E+01	—	—	2.2E+03	—	—
Trichloroethylene ^c	0	—	—	na	3.0E+02	—	na	4.2E+04	—	—	na	3.0E+01	—	—	4.2E+03	—	—
2,4,6-Trichlorophenol ^c	0	—	—	na	2.4E+01	—	na	3.4E+03	—	—	na	2.4E+00	—	—	3.4E+02	—	—
2-(2,4,5-Trichlorophenoxy)propanoic acid (Silvex)	0	—	—	na	—	—	na	—	—	na	—	—	—	—	—	—	—
Vinyl Chloride ^c	0	—	—	na	2.4E+01	—	na	3.4E+03	—	—	na	2.4E+00	—	—	3.4E+02	—	—
Zinc	0	4.0E+01	4.0E+01	na	2.6E+04	3.6E+02	4.4E+02	na	8.6E+05	1.0E+01	1.0E+01	na	2.6E+03	9.1E+01	1.1E+02	na	8.6E+04

Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for industries and design flow for Municipal
- Metals measured as Dissolved, unless specified otherwise
- *C indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
- Antidegradation WLAs are based upon a complete mix.
- Antideg. Baseline = (0.1(WQC - background conc.) + background conc.) for acute and chronic

$$= (0.1(WQC - \text{background conc.}) + \text{background conc.}) \text{ for human health}$$
- WLAs established at the following stream flows: 1Q10 for Acute, 3Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Note: do not use QL's lower than the minimum QL's provided in agency guidance

Metal	Target Value (SSTV)
Antimony	2.1E-03
Arsenic	2.5E+02
Barium	na
Cadmium	6.9E-01
Chromium III	4.3E-01
Chromium VI	1.4E+01
Copper	3.7E+00
Iron	na
Lead	4.4E+00
Manganese	na
Mercury	1.3E+00
Nickel	1.1E+01
Selenium	8.3E+00
Silver	3.5E-01
Zinc	3.6E+01

7/16/2010 8:31:04 AM

Facility = Boones Mill STP all units mg/L
Chemical = ammonia - yearly
Chronic averaging period = 30
WLAA = 39
WLAC = 16
Q.L. = 0.20
samples/mo. = 1
samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 9
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007
97th percentile 4 day average = 14.9741
97th percentile 30 day average= 10.8544
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

7/15/2010 4:11:58 PM

Facility = Boones Mill STP
Chemical = chlorine
Chronic averaging period = 4
WLAA = 0.17
WLAC = 0.12
Q.L. = 0.10
samples/mo. = 30
samples/wk. = 8

all units mg/L

Summary of Statistics:

observations = 1
Expected Value = 20
Variance = 144
C.V. = 0.6
97th percentile daily values = 48.6683
97th percentile 4 day average = 33.2758
97th percentile 30 day average= 24.1210
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 0.17
Average Weekly limit = 0.101405864603378
Average Monthly LImit = 8.42555978575054E-02

The data are:

APPENDIX E

DISSOLVED OXYGEN MODELING

MODELING RATIONALE MEMO

STREAM INSPECTION REPORT

MODEL INPUT & OUTPUT

M E M O R A N D U M

**VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER DIVISION
BLUE RIDGE REGIONAL OFFICE
3019 Peters Creek Road
Roanoke, Virginia 24019-2738**

Subject: Dissolved Oxygen Modeling for VPDES Permit Reissuance – VA0067245
Town of Boones Mill Sewage Treatment Plant (STP)

To: Permit File

From: Bob Tate, water permit writer *BST*

Date: August 26, 2010

This memo documents dissolved oxygen modeling rationale for discharge from the Boones Mill Sewage Treatment Plant (STP). The approach was very conservative, as explained later.

Receiving stream observations were made at the site visit Thursday morning, July 9, 2010. Stream width at the discharge point was estimated to be 25 feet, but observations downstream indicated stream width varied from 10 to 30 feet. Stream flow that morning at the Blackwater River flow gauge was 30–34 cfs; 32 cfs is 1Q10 high flow for the Blackwater gauge. So 15 feet was selected as typical width for 7Q10 flow in the receiving segment of Maggodee Creek.

Stream depth, pool, and riffle characteristics were also difficult to estimate. The model required adjustment of pool and riffle values. Observed estimations of pool and riffle depths were significantly reduced: pool depth from 1 foot to 0.5 foot and riffle depth from $\frac{1}{4}$ foot to 0.1 foot. Observed estimations of relative pool and riffle lengths were also changed drastically: pools from 50% of length to 15%, and riffles from 50% of length to 85%.

Channel cross section was considered irregular. Using DEQ GIS aerial photos, the segment was determined to be moderately meandering. Although the stream bottom contained silt, sand, gravel, small and large rock, small rock was chosen for the model.

The model is not designed for intermittent discharges, but the model is appropriate because the STP discharges continuously for three to four weeks at a time. Only one stream segment was modeled, from the current discharge location at stream mile 15.47 to the previous discharge location at stream mile 15.20. There are no tributaries within the segment. Stream slope of 0.005 feet/feet (from topographic map) projected 7 feet elevation drop over 0.27 miles (1425 feet).

The drainage area method of flow determination was used, similar to that described in the flow frequency determination memo.

Town of Boones Mill STP
Dissolve Oxygen Modeling for VPDES Permit Reissuance
Page 2

Background (ambient) temperature was the 90th percentile annual temperature calculated for the Water Quality Criteria/Wasteload Allocation Analysis Spreadsheet (spreadsheet). Model default values were used for background BOD and TKN.

Discharge temperature was the 90th percentile value of daily temperatures recorded during summer discharges (25.1 °C). This value was higher than the 90th percentile annual temperature calculated for the spreadsheet (19.5 °C) and was chosen to represent near worst-case ammonia conditions. The permit monthly average limit (30 mg/L) was used for discharge cBOD. TKN (organic nitrogen plus ammonia) was assumed to be 3 mg/L (organic nitrogen) plus 9 mg/L (ammonia). Effluent DO was varied to determine a DO limit that would satisfy antidegradation's maximum 0.2 mg/L DO drop. Ultimately, 5.0 mg/L effluent DO produced a DO drop of 0.206 mg/L in the mixing zone (at distance 0 miles). There was no DO sag beyond the mixing zone.

The model predicted that:

- antidegradation will be satisfied.
- DO will increase steadily beyond the mixing zone;
- cBOD and nBOD will steadily decrease.

All predicted DO concentrations are significantly above DO water quality criteria: 4.0 mg/L (minimum) and 5.0 mg/L (daily average).

The model validates discharge from the facility during extreme conditions with a DO limit of 5.0 mg/L.

Attachments: Model File and Steam Inspection Report Form (2 pages)
model input and output data sheets (3 pages)

MODEL FILE AND STREAM INSPECTION REPORT FORM
Page 1

Discharge Name: Bones Mill STP

Location: Franklin County

Model File Path/Name: _____

Inspection Date: 7 / 8 / 10 Modeler: Bob Tate

General Stream Information:

Stream Name: Mammoth Creek

Basin: Rainbow Section: 6a Class: III Special Standards: NEW-1

Are the standards for this stream violated due to natural causes? (Y/N) bacteria

Is the stream correctly classified? (Y/N) Y

If "N", what is the correct classification? _____

Model Segmentation:

Number of segments to be modeled: 1

Flow Gauge / Flow Frequency Information (Attach Copy):

Gauge Used: 07056950

Drainage Area/Observed Flow At The Gauge: 11.02 sq. mi./mgd

Drainage Area/Observed Flow At The Start of The Model: 14.19 sq. mi./mgd

7Q10 of the Gauge: 0.23 mgd

Flow Adjustment for Springs or Dischargers: 0 mgd

Background Water Quality:

Elevation at the Start of the model: 1075 ft above mean sea level

Elevation at the End of the model: 1068 ft above mean sea level

Critical Temperature: 24.8 °C (attach data and analysis) 90% annual temp

Ambient Monitoring Gauge Used: 4 AME 021.13

Additional Discharges Information:

Is there a discharger within 3 miles upstream of the proposed discharge? (Y/N) N

Does antidegradation apply to this analysis? (Y/N) N If so, which segment(s)? _____

Is any segment on the current 303(d) list for D.O. violations? (Y/N) N

Is any segment of the model within an approved D.O. TMDL segment? (Y/N) N

Is any discharge to the model intermittent? (Y/N) N seasonal

Any dams in stream section being modeled? (Y/N) N

Notes/Sketch:

MODEL FILE AND STREAM INSPECTION REPORT FORM
Page 2

(Fill In This Page FOR EACH SEGMENT To Be Modeled)

Segment Number:		1			
Reason for Defining Segment:		Discharge at Beginning of Segment	<input checked="" type="checkbox"/>		
		Physical Change at Beginning of Segment	<input type="checkbox"/>		
		Tributary at Beginning of Segment	<input type="checkbox"/>		
Length of Segment (mi.):		0.27			
Drainage Area at Start of Segment (sq. mi.):		14.19			
Drainage Area at End of Segment (sq. mi.):		?			
Elevation at Start of Segment (ft.):		1075			
Elevation at End of Segment (ft.):		1068			
If Discharge or Tributary At Beginning of Segment, Complete the Following:					
Discharge/Tributary Name:		Brynes Mill STP			
Discharge/Tributary Temperature (C): (If different from background ambient)		25.1			
Critical Discharge/Tributary Flow (mgd): (Design/Permitted Flow or 7Q10 Condition) (use permitted or design flow for discharges, 7Q10 flow from flow frequency analysis for tributaries)		0.030			
For Dischargers Only: (use permitted Concentrations)	CBOD₅ (mg/l):	30			
	TKN (mg/l):	12			
	D.O. (mg/l):	0			
General Type of Cross Section in Segment: (7Q10 Condition)					
Rectangular <input type="checkbox"/>	Triangular <input type="checkbox"/>	Deep Narrow U <input type="checkbox"/>	Wide Shallow Arc <input type="checkbox"/> Irregular <input checked="" type="checkbox"/> No Defined Channel <input type="checkbox"/>		
General Channel Characteristics of Segment: (7Q10 Condition)					
Mostly Straight <input type="checkbox"/>	Moderately Meandering <input checked="" type="checkbox"/>	Severely Meandering <input type="checkbox"/>	No Defined Channel <input type="checkbox"/>		
Does the stream have a pool and riffle character (Y/N)? (7Q10 Condition)					
If "Y":	% of length that is pools <u>50 → 15</u>	Average depth of pools (ft) <u>1 → .5</u>			
	% of length that is riffles <u>50 → 85</u>	Average depth of riffles (ft) <u>.14 → .1</u>			
Bottom:	Sand <input checked="" type="checkbox"/>	Silt <input checked="" type="checkbox"/>	Gravel <input type="checkbox"/> Small Rock <input checked="" type="checkbox"/>	Large Rock <input type="checkbox"/> Boulders <input type="checkbox"/>	
Sludge Deposits:	None <input checked="" type="checkbox"/>	Trace <input type="checkbox"/>	Light <input type="checkbox"/>	Heavy <input type="checkbox"/>	
Plants:	<u>Rooted:</u> <input type="checkbox"/>	None <input checked="" type="checkbox"/>	Few <input type="checkbox"/>	Light <input type="checkbox"/>	Heavy <input type="checkbox"/>
	<u>Algae:</u> <input type="checkbox"/>	Film on Edges Only <input type="checkbox"/>		Film on Entire Bottom <input type="checkbox"/>	
Projected 7Q10 Width of Segment (ft): (must be projected by modeler based on site visit)				25 → 15	
Projected 7Q10 Depth of Segment (ft): (can be calculated by model based on width)					
Projected 7Q10 Velocity of Segment (ft): (can be calculated by model based on width)					
Does the water have an evident green color? (Y/N)				no	

modout.txt
"Model Run For I:\rstate\Boones Mill\VPDES permitting\DO Model for Boones Mill
discharge [BM].mod On 8/26/2010 10:01:20 AM"

"Model is for MAGGODEE CREEK."
"Model starts at the BOONES MILL STP discharge."

"Background Data"
"7Q10", "CBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.2962, 2, 0, 7.243, 24.8

"Discharge/Tributary Input Data for Segment 1"
"Flow", "CBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.03, 30, 12, .5, 25.1

"Hydraulic Information for Segment 1"
"Length", "Width", "Depth", "Velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
.27, 15, .149, .225

"Initial Mix Values for Segment 1"
"Flow", "DO", "CBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.3262, 7.037, 11.439, 3.584, 8.045, 24.82759

"Rate Constants for Segment 1. - (All units Per Day)"
"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
1, 1.248, 15.556, 17.443, .35, .507, 0, 0

"Output for Segment 1"
"Segment starts at BOONES MILL STP"
"Total", "Segm."
"Dist.", "Dist:", "DO", "CBOD", "nBOD"
"(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
0, 0, 7.037, 11.439, 3.584
.1, .1, 7.075, 11.058, 3.535
.2, .2, 7.109, 10.689, 3.487
.27, .27, 7.132, 10.438, 3.454

"END OF FILE"

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to MAGGODEE CREEK.

File Information

File Name: I:\rstate\Boones Mill\VPDES permitting\DO Model for Boones Mill dischar
Date Modified: August 25, 2010

Water Quality Standards Information

Stream Name: MAGGODEE CREEK
River Basin: Roanoke River Basin
Section: 6a
Class: III - Nontidal Waters (Coastal and Piedmont)
Special Standards: NEW-1

Background Flow Information

Gauge Used: 02056950 Maggodee Creek above Boones Mill
Gauge Drainage Area: 11.02 Sq.Mi.
Gauge 7Q10 Flow: 0.23 MGD
Headwater Drainage Area: 14.19 Sq.Mi.
Headwater 7Q10 Flow: 0.2961615 MGD (Net; includes Withdrawals/Discharges)
Withdrawal/Discharges: 0 MGD
Incremental Flow in Segments: 2.087114E-02 MGD/Sq.Mi.

Background Water Quality

Background Temperature: 24.8 Degrees C
Background cBOD5: 2 mg/l
Background TKN: 0 mg/l
Background D.O.: 7.243012 mg/l

Model Segmentation

Number of Segments: 1
Model Start Elevation: 1075 ft above MSL
Model End Elevation: 1068 ft above MSL

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to MAGGODEE CREEK.

Segment Information for Segment 1

Definition Information

Segment Definition: A discharge enters.
Discharge Name: BOONES MILL STP
VPDES Permit No.: VA0067245

Discharger Flow Information

Flow: 0.03 MGD
cBOD5: 30 mg/l
TKN: 12 mg/l
D.O.: 5 mg/l
Temperature: 25.1 Degrees C

Geographic Information

Segment Length: 0.27 miles
Upstream Drainage Area: 14.19 Sq.Mi.
Downstream Drainage Area: 0 Sq.Mi.
Upstream Elevation: 1075 Ft.
Downstream Elevation: 1068 Ft.

Hydraulic Information

Segment Width: 15 Ft.
Segment Depth: 0.149 Ft.
Segment Velocity: 0.225 Ft./Sec.
Segment Flow: 0.326 MGD
Incremental Flow: -0.296 MGD (Applied at end of segment.)

Channel Information

Cross Section: Irregular
Character: Moderately Meandering
Pool and Riffle:
 Percent Pools: 15
 Percent Riffles: 85
 Pool Depth: 0.5 Ft.
 Riffle Depth: 0.1 Ft.
Bottom Type: Small Rock
Sludge: None
Plants: None
Algae: None

APPENDIX F

2010 IMPAIRED WATERS FACT SHEETS

Maggodee Creek – bacteria
Maggodee Creek – benthic
Maggodee Creek – temperature
Blackwater River – PCBs

BACTERIA TMDL WASTELOAD ALLOCATION



2010 Impaired Waters

Categories 4 and 5 by DCR Watershed*

Roanoke and Yadkin River Basins

Fact Sheet for DCR Watershed: L09.*

Cause Group Code: **L09R-01-BAC** **Maggodee Creek**

Location: The upstream limit is Maggodee Creek mainstem waters from the Boones Mill Town area downstream to the mouth of Maggodee Creek on the Blackwater River.

City / County: Franklin Co.

Use(s): Recreation

Cause(s)* /

VA Category: Escherichia coli/ 4A

The Maggodee Creek Bacteria Total Maximum Daily Load (TMDL) received U.S. EPA approval on 4/27/2001 [Fed. IDs: 1562/9475] and SWCB approval on 6/17/2004 (formerly VAW-L09R-01) for the former 20.18 mile impairment. A total of 15.78 miles remain impaired for the Recreational Use. The 2008 Integrated Report (IR) results from station 4AMEE021.13 (Rt. 613 Bridge Below Conflu./w Fork) find no excursions of the E.coli 235 cfu/100 ml instantaneous criterion from 12 samples. This portion (4.40 miles) is partially delisted (U.S. EPA approved 12/18/2008) with the 2008 IR leaving the remaining impaired total at 15.78 miles.

The TMDL Study incorporates tributary streams that lie within the boundaries of watershed VAW-L09R. The Lower Blackwater River Bacteria Implementation Plan (IP) received SWCB approval on 9/27/2006. The Lower Blackwater River Bacteria IP encompasses the lower Blackwater River (L10R) including the backwaters of Smith Mtn. Lake (L10L), Maggodee (L09R) and Gills (L11R) Creeks. The entirety of the approved study with allocations can be viewed at <http://www.deq.virginia.gov>.

The bacteria impairment is a 1996 303(d) Listing based on a 319 funded special study (SS 925102) and ambient sample collections. Abundant fecal coliform (FC) bacteria counts failed to support the Recreational Use by exceedances of both the former fecal coliform geometric mean (200 n/100 ml) & 2 samples/month) and the former (2002) instantaneous criterion of 1000 n/100 ml. Escherichia coli (E.coli) now replaces fecal coliform bacteria as the indicator per Water Quality Standards [9 VAC 25-260-170. Bacteria; other waters].

4AMEE009.86- (Rt. 635 Bridge) 2010 Escherichia coli (E. coli) samples exceed the instantaneous criterion of 235 cfu/100 ml in 10 of 24 ranging from 250 to greater than 800 cfu/100 ml. E.coli exceeds the instantaneous criterion in seven of 18 samples ranging from 250 to greater than 800 cfu/100 ml in 2008.

4AMEE007.85- (Rt. 687 Bridge above Mollie Br.) There are no additional data beyond the 2006 IR where E.coli exceed the WQS instantaneous criterion in eight of 17 observations. The range of exceedance is from 240 to greater than 800 cfu/100 ml. Observations within the 2008 data window are two of six excursions of the instantaneous criterion.

4AMEE004.90- (Rt. 697 Bridge) E.coli exceed the 235 cfu/100 ml WQS instantaneous criterion in 16 of 33 observations within the 2010 data window. The range of exceedance is from 240 cfu/100 ml to greater than 2000. 2008 data reveal E.coli exceeds the WQS instantaneous criterion in 16 of 27 observations. The range of exceedance is from 240 cfu/100 ml to greater than 800. Sixteen of 26 observations exceed in 2006 with an exceedance range of 310 cfu/100 ml to greater than 800.

Maggodee Creek

*DCR Watershed: L09 - Recreation

Escherichia coli - Total Impaired Size by Water Type:

Estuary*	Reservoir*	River*
(Sq. Miles)	(Acres)	(Miles)

15.78



2010 Impaired Waters

Categories 4 and 5 by DCR Watershed*

Roanoke and Yadkin River Basins

Sources:

Livestock (Grazing or Feeding Operations)	On-site Treatment Systems (Septic Systems and Similar Decentralized Systems)	Unspecified Domestic Waste	Wildlife Other than Waterfowl
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*Header Information: Location, City/County, Cause/VA Category and Narratives; describe the entire extent of the Impairment. Sizes presented are for Assessment Units (AUs) lying within the DCR Watershed boundary noted above.



2010 Impaired Waters

Categories 4 and 5 by DCR Watershed*

Roanoke and Yadkin River Basins

Fact Sheet for DCR Watershed: L09.*

Cause Group Code: L09R-01-BEN Maggodee Creek

Location: Maggodee Creek mainstem from Piedmont Mill Dam downstream to the mouth of Maggodee Creek on the Blackwater River.

City / County: Franklin Co.

Use(s): Aquatic Life

Cause(s)* /

VA Category: Benthic-Macroinvertebrate
Bioassessments/ 5A

Non-support of the Aquatic Life Use is originally based (2002- formerly VAW-L09R-01) on Rapid Bioassessment Protocol II surveys (RBP II) conducted at 4AMEE002.38. The station is no longer accessible and is moved to 4AMEE000.70 and assessed using the Virginia Stream Condition Index (VSCI). The 7.36 mile 2002 303(d) Listed General Standard (Benthic) impairment remains.

4AMEE000.70- (Below Rt. 122 Bridge) Bio 'IM' There are no additional data beyond the 2008 IR. One 2002 Virginia Stream Condition Index (VSCI) survey scoring 47.2. Sediment deposition from agricultural runoff appears to have a large impact on the benthic community. Habitat scores for embeddedness and sediment deposition were the lowest of the ten habitat parameters. Both parameters fell in the marginal category. In 2006 three RBP II surveys, outside the 2008 data window, produce an average score of 44.9 at this site. Two surveys in the spring result in scores of 30.43 (2000) and 52.17 (2002). The fall 2000 survey score is 52.17.

Maggodee Creek	Estuary* (Sq. Miles)	Reservoir* (Acres)	River* (Miles)
*DCR Watershed: L09 - Aquatic Life Benthic-Macroinvertebrate Bioassessments - Total Impaired Size by Water Type:			7.36

Sources:

Livestock (Grazing or
Feeding Operations)

Loss of Riparian Habitat

Sediment Resuspension
(Clean Sediment)

*Header Information: Location, City/County, Cause/VA Category and Narratives; describe the entire extent of the Impairment. Sizes presented are for Assessment Units (AUs) lying within the DCR Watershed boundary noted above.



2010 Impaired Waters

Categories 4 and 5 by DCR Watershed*

Roanoke and Yadkin River Basins

Fact Sheet for DCR Watershed: L09.*

Cause Group Code: L09R-01-TEMP Maggodee Creek

Location: Maggodee Creek mainstem waters from the confluence of North and South Forks of Maggodee Creek downstream to just below the Rt. 220 crossing at Boones Mill.

City / County: Franklin Co.

Use(s): Aquatic Life

Cause(s)* /

VA Category: Temperature, water/ 5C

The Aquatic Life Use is not supported for 4.40 miles due to temperature exceedances for this stockable trout water (21°C).

4AMEE021.13- (Rt. 613 Bridge Below Conflu./w Fork) Four of 24 temperature measurements exceed the stockable trout water criterion in 2010. Temperature exceedances occur at 21.1°C on 8/5/2004; 21.4°C on 6/30/2005; 25.2°C on 8/01/2007; and 23.4°C on 6/11/2008. The 2008 assessment reports one temperature exceedance at 21.1°C on 8/5/2004 and a second at 21.4°C on 6/30/2005 from 12 measurements. These excursions are in excess of the 21°C stockable trout water criterion causing the initial Listing of these waters in 2008.

Maggodee Creek	Estuary* (Sq. Miles)	Reservoir* (Acres)	River* (Miles)
*DCR Watershed: L09 - Aquatic Life	Temperature, water - Total Impaired Size by Water Type:		4.40

Sources:

Source Unknown

*Header Information: Location, City/County, Cause/VA Category and Narratives; describe the entire extent of the impairment. Sizes presented are for Assessment Units (AUs) lying within the DCR Watershed boundary noted above.



2010 Impaired Waters

Categories 4 and 5 by Basin & Stream Name

Roanoke and Yadkin River Basins

Cause Group Code: L12L-01-PCB

Roanoke River, Blackwater River, Smith Mountain Lake, Tinker Creek and Peters Creek.

Location: Roanoke River from the confluence of the North and South Forks downstream to Smith Mtn. Dam. Blackwater River from the Rt. 122 crossing downstream to its confluence with the Roanoke River in Smith Mtn. Lake. Peters Creek from the Rt. 460 Bridge downstream to its confluence on the Roanoke River. Tinker Creek from the mouth of Deer Branch downstream to the Tinker Creek confluence on the Roanoke River.

City / County: Bedford Co. Botetourt Co. Franklin Co. Montgomery Co. Pittsylvania Co.
Roanoke City Roanoke Co. Salem City

Use(s): Fish Consumption Public Water Supply Wildlife

Cause(s) /

VA Category: PCB in Fish Tissue/ 5A PCB in Water Column/ 5A

The waters of the Roanoke River (31.74 miles), Blackwater River (11.29 miles), Peters Creek (2.52 miles), Tinker Creek (5.33 miles) and Smith Mountain Lake (19,789.92 acres) are under a Virginia Department of Health (VDH) Fish Consumption Advisory for Polychlorinated Biphenols (PCB) issued 7/27/05. The VDH Advisory is based on fish tissue found to originally contain greater than 50 parts per billion (ppb) of PCBs. The DEQ Water Quality Standard (WQS) based tissue value (TV) criterion is 20 ppb in fish tissue. The previous advisory (issued 10/20/03) recommended that no more than two eight-ounce meals per month of flathead catfish (less than 32 inches in size), striped bass, gizzard shad, redhorse sucker, largemouth bass and carp should be consumed. Per the previous advisory, flathead catfish (greater than 32 inches in size) should not be eaten. The advisory has been updated to also recommend that no more than two eight-ounce meals per month of channel catfish should be consumed.

There are 26 fish tissue collection sites within the 2010 data window reporting exceedances of the DEQ WQS based 20 ppb fish tissue value (TV). Stations are located on the Roanoke mainstem, Blackwater River, Mason Creek, Mudlick Creek, Paint Bank Branch, Peters Creek, Tinker Creek and the North and South Forks of the Roanoke River. These data are reviewed by the VDH in making an advisory determination. A complete listing of collection sites and associated fish tissue data are available at <http://www.deq.virginia.gov/fishtissue/fishtissue.html>. A more detailed presentation of the data can also be found using an interactive mapping application at <http://www.deq.virginia.gov/wqa/>. The VDH Advisory information is also available via the web at <http://www.vdh.virginia.gov/epidemiology/DEE/PublicHealthToxicology/Advisories/index.htm>.

Thirty day deployment of Semi-Permeable Membrane Devices (SPMD) or virtual fish in 2008 find exceedances of the WQS PCB water column criterion of 0.00064 micrograms per liter ($\mu\text{g}/\text{L}$) or 640 picograms per liter (pg/L). Exceedances are recorded for both the Fish Consumption Use via WQS 'Other Waters' (15.23 miles) as well as the Wildlife Use (15.23 miles) and for the 'Public Water Supply Use' (PWS 4.78 miles) human health criterion at the stations listed below. The 640 pg/l criterion applies to both Uses. The 'PCB in Water Column' impairment on the mainstem of the Roanoke River extends from the confluence of Mason Creek downstream to the mouth of Back Creek (miles). The 'PCB in Water Column' impairment overlays a 15.23 mile portion of the overall VDH Fish Consumption Advisory area above Smith Mountain Lake.

4AROA207.08- (Near Memorial Bridge downstream of Peters Creek)- 2008 SPMD 'OE'. Exceeds PCB WQS 'Other Waters' 640 pg/L criterion from one of two deployments at 642.

4AROA204.76 (Downstream of Ore Br., near VA Scrap Iron Co. above American Visco)- Two SPMD deployments find exceedance of the WQS 'Other Waters' 640 pg/L criterion at 987 and 3,014 pg/L.

4AROA202.20 (14th Street Bridge - above STP)- Two SPMD deployments find exceedance of the WQS 'Other Waters' 640 pg/L criterion at 1,376 and 3,044 pg/L.

4AROA199.20 (Blue Ridge Parkway Bridge - Niagara)- Two SPMD deployments find exceedance of the WQS 'Other Waters' and 'PWS' 640 pg/L criterion at 1,213 and 1,588 pg/L.



2010 Impaired Waters

Categories 4 and 5 by Basin & Stream Name

Roanoke and Yadkin River Basins

Roanoke River, Blackwater River, Smith Mountain Lake, Tinker Creek and Peters Creek. Fish Consumption	Estuary (Sq. Miles)	Reservoir (Acres)	River (Miles)
PCB in Fish Tissue - Total Impaired Size by Water Type:		19,789.82	50.88
Roanoke River, Blackwater River, Smith Mountain Lake, Tinker Creek and Peters Creek. Fish Consumption	Estuary (Sq. Miles)	Reservoir (Acres)	River (Miles)
PCB in Water Column - Total Impaired Size by Water Type:			15.23
Roanoke River, Blackwater River, Smith Mountain Lake, Tinker Creek and Peters Creek. Public Water Supply	Estuary (Sq. Miles)	Reservoir (Acres)	River (Miles)
PCB in Water Column - Total Impaired Size by Water Type:			4.78
Roanoke River, Blackwater River, Smith Mountain Lake, Tinker Creek and Peters Creek. Wildlife	Estuary (Sq. Miles)	Reservoir (Acres)	River (Miles)
PCB in Water Column - Total Impaired Size by Water Type:			15.23

Sources:

Source Unknown

*Narrative descriptions, Location and City/County describes the entire extent of the impairment. Sizes may not represent the total overall size of the impairment in terms of stream name only.

Total Allowable Loads

Virginia indicates that the total allowable loading of fecal coliform is the sum of the loads allocated to land based, precipitation driven nonpoint source areas (good pasture, poor pasture, cropland, forest, urban, farmstead, loafing lots, and livestock access), directly deposited nonpoint sources of fecal coliform (cattle in-stream, wildlife in-stream, straight pipes, and lateral flow), and point sources. Activities such as the application of manure, fertilizer, and the direct deposition of wastes from grazing animals are considered fluxes to the land use categories. The actual value for the total fecal load can be found in Table #1 of this document. The total allowable load is calculated on an annual basis due to the nature of HSPF model.

Waste Load Allocations

Boones Mill Wastewater Treatment Plant (WWTP) is the only point source discharging to the impaired segment of Maggodee Creek. Boones Mill WWTP has an effluent limit of 200cfu/100 ml. The treatment plant is required to chlorinate its effluent. Therefore, the actual end of pipe concentrations are much lower than the permitted concentrations. The plant was modeled in the allocation scenario as discharging its permitted concentration (200 cfu/100 ml) at its design flow capacity (0.3 million gallons per day).

EPA regulations require that an approvable TMDL include individual Waste Load Allocations (WLAs) for each point source. According to 40 CFR 122.44(d)(1)(vii)(B), "Effluent limits developed to protect a narrative water quality criterion, a numeric water quality criterion, or both, are consistent with assumptions and requirements of any available WLA for the discharge prepared by the State and approved by EPA pursuant to 40 CFR 130.7." Furthermore, EPA has authority to object to the issuance of any NPDES permit that is inconsistent with the WLAs established for that point source.

Table #2 - Waste Load Allocations for the Impaired Segment of Maggodee Creek

Facility	Permit Number	Existing Load	Allocated Load
Boones Mill WWTP	VA0067245	8.27E+10	8.27E+10

Load Allocations

According to federal regulations at 40 CFR 130.2 (g), load allocations are best estimates of the loading, which may range from reasonably accurate estimates to gross allotments, depending on the availability of data and appropriate techniques for predicting loading. Wherever possible, natural and nonpoint source loads should be distinguished.

VADEQ recognizes the significant loading of fecal coliform from cattle in-stream, straight pipes, wildlife in-stream, and failed septic systems (lateral flow). These sources are not dependent on a transport mechanism to reach a surface waterbody and therefore can impact water quality during low and high flow events. As stated above a factor value was incorporated into the loading. This factor value was an attempt to address an unknown mechanism that

ADDENDUM A

The TMDL developed for Maggodee Creek was based on the Virginia State Standard for fecal coliform. As detailed in Section 1.2, the fecal coliform standard states that the 30-day, geometric-mean concentration shall not exceed 200 cfu/100 ml. As such, pollutant concentrations were modeled over the entire duration of a representative modeling period, and pollutant loads were adjusted until the standard, reduced by a margin of safety equal to 5%, was met (Figure 5.4). Table AA.1 represents the average annual loads during the modeled period after allocation of pollutant loads. Loads from permitted point sources (WLA) and nonpoint sources (LA) are represented, as are the load associated with the margin of safety (MOS) and the sum of these three loads (TMDL). It is worth noting that the MOS is much less than 5% of the TMDL. This outcome illustrates the inherent difference between concentration, which is the amount of a pollutant (e.g. numbers of fecal coliforms) in a given volume of water, and annual loads, which is the total amount of the pollutant regardless of the volume of water. Additionally, this situation reflects the fact that it would be inappropriate to use annual loads, such as those in Table AA.1, as a target goal for meeting a water quality standard that is based on concentrations.

Table AA.1 Average annual loads (cfu/year) modeled after TMDL allocation in the Maggodee Creek Watershed.

Impairment	WLA	LA	MOS	TMDL
Maggodee Creek ¹	8.27E+10	1.86E+15	4.39E+12	1.86E+15

¹ The only point source permitted for fecal control in the Maggodee Creek drainage is Boones Mill Wastewater Treatment Plant (VPDES # VA0067245).

ADDENDUM B**The Lower Blackwater River and Maggodee Creek Factor Value:**

During the development of this TMDL, it was discovered that, in low flow conditions, the model consistently under represented the concentration of fecal coliform in these river segments. These under estimations were more pronounced in Maggodee Creek and the smaller tributaries of the lower Blackwater. The model used for this TMDL duplicated the assumptions and loadings that were used for TMDL development in the four Upper Blackwater River segments (North Fork of the Blackwater, South Fork of the Blackwater, Middle Fork of the Blackwater, and the Upper Blackwater). Since the assumptions made in the previous TMDLs allowed us to develop a model that accurately reflected the concentrations of fecal coliform in the upper segments, it was felt that a change in the loadings would question the integrity of both studies. It was believed that an unknown mechanism may be contributing to the elevated fecal coliform concentrations detected in this segment.

One possible mechanism would be the resuspension of deposited fecal coliforms. An agent (cattle in-stream or other mechanism) causing a resuspension of bacteria may be responsible for the elevated fecal coliform concentrations. The model developed for this TMDL, used a factor value based on the likelihood that cattle in-stream were causing the resuspension of fecal coliform. The relative size of the factor value was determined by dividing the stream access area by the sum of the pasture area and the stream width.